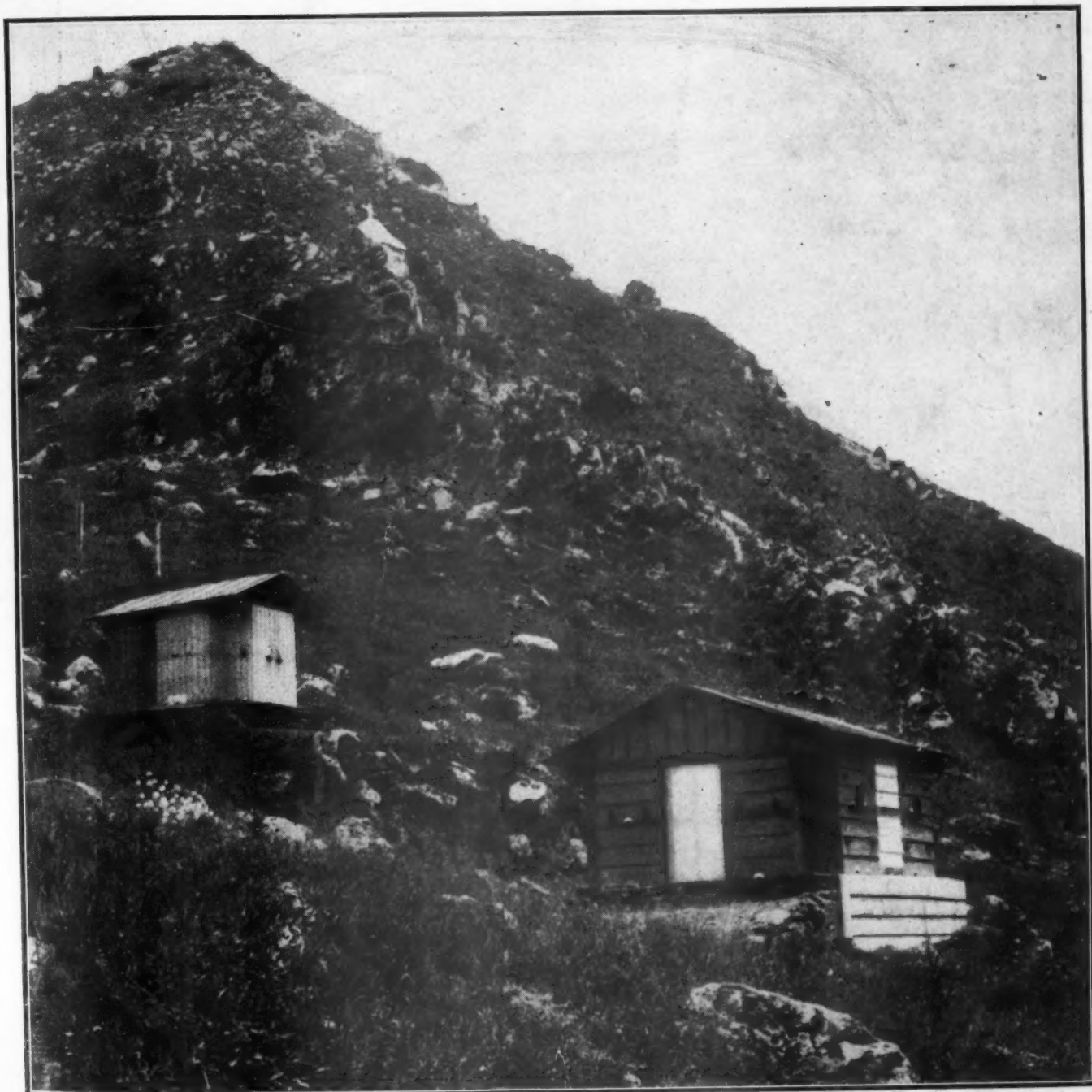


AMERICAN BEE JOURNAL

JULY, 1920



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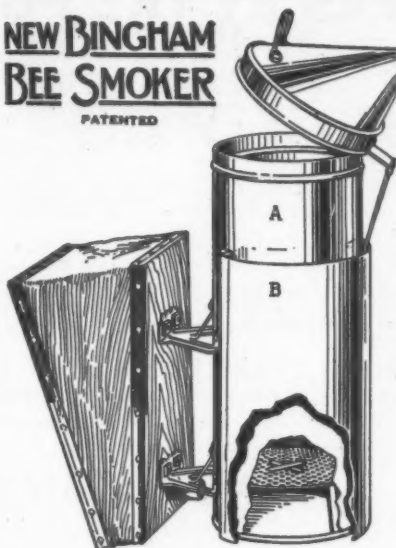
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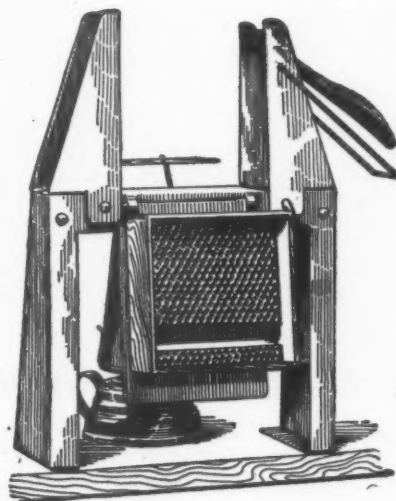
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G. B. Lewis Company,
Watertown, Wisconsin

Charleston, W. Va.
May 5, 1920

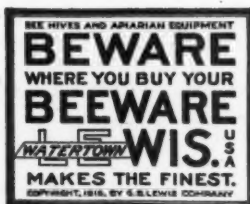
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VOL. LX—NO. 7

HAMILTON, ILL., JULY, 1920

MONTHLY, \$1.00 A YEAR

Some Observations on European Foulbrood

By G. F. White, Bureau of Entomology, U. S. Dept. Agr., Washington, D. C.

EUROPEAN foulbrood is an infectious disease of honeybees that is characterized by the death of the brood during its uncapped stage, and by the absence of both ropiness and disagreeable odor. Studies on the disease were made by the writer from 1902 to 1916 and some of the observations are given in the present article. Those who may be interested in the results obtained can find a more detailed summary of them in Bulletin 810.* No work directly on the treatment of the disease was attempted, but in choosing problems for study those were selected which by their solution would furnish information that could be applied readily by the beekeeper in any revision of methods of treatment now in use, which might be needed, or in devising new ones.

Causes of European Foulbrood

European foulbrood can be produced experimentally (Fig. 1.) by feeding a colony syrup which contains the crushed bodies of larvæ sick or dead of the disease. The larvæ become infected during the feeding stage, infection taking place at some time during the period from about 2 days of age to capping. Larvæ live more than 2 days after becoming infected. If they die, therefore, they are 4 days old or older at the time of death. Since larvæ are capped about 4 days before pupation, it is to be expected that death would occur before the pupal stage is reached, and this is what happens. Worker, drone and queen larvæ are susceptible to infection; adult bees are not. This is true of all races of bees kept by American beekeepers.

Since European foulbrood occurs

at least in Austria, Denmark, England, Germany, Switzerland, Canada and the United States, the disease cannot be attributed entirely to climatic conditions nor to the kind of food obtained by the bees. The course of the disease is affected somewhat, however, by the quantity of food obtained and by the season of the year.

The exciting cause of European foulbrood is a germ† (Fig. 2) that is taken into the stomach of the larva with its food. The name of it is *Bacillus pluton*. It is very small, about 25,000 of them placed end to end measure an inch. Some are spherical, others are egg-shaped, while most of them in larvæ that are dead of the disease, or nearly so, are more or less oval, and with somewhat pointed ends. The germ does not bear spores. Being the cause of European foulbrood, it is always present in brood sick or dead of the disease.

† The "germ" causing European foulbrood is a very small plant which, after reaching the stomach of the larva, grows, multiplies and produces sickness and usually death of the larva. It belongs to a group of plants called bacteria. "Microbe" and "parasite" are sometimes used instead of the term "germ." *Bacillus pluton* is a convenient name for this plant. The other germs found in this disease are plants also.

Other germs are almost invariably found in brood dead of European foulbrood, but none of these additional ones cause disease. One of them is *Bacillus alvei* (Fig. 3). This is an elongated slender rod; about 10,000 are required to measure an inch. It produces spores. By comparing *Bacillus pluton* (Fig. 2) and *Bacillus alvei* (Fig. 3) one can readily see that they are very different germs.

Another germ which does not produce disease, but which is occasionally present in brood dead of European foulbrood is *Streptococcus apis* (Fig. 4). This one is more or less spherical and resembles *Bacillus pluton* (Fig. 2) both in size and form. The two, however, are very different, more so, probably, than is the apple tree different from the oak.

Names of the Diseases

The names that are at present being used for the brood diseases in the different countries are rather intimately connected with studies made on the germs contained in the brood dead of the different diseases. In 1885, *Bacillus alvei* was found in brood dead of foulbrood by Cheshire and Cheyne of England, and for about a

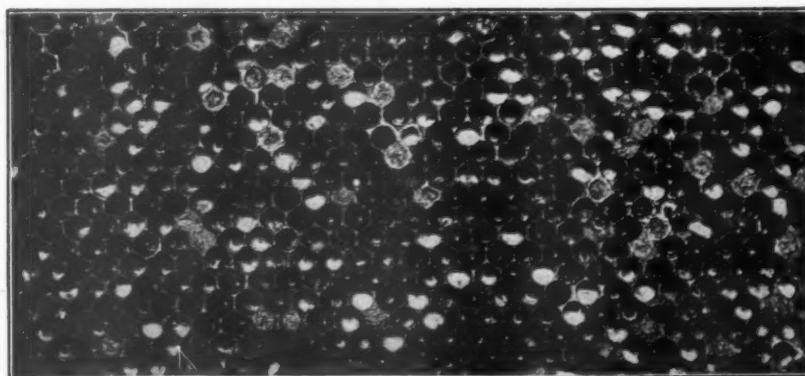


Fig. 1. European foulbrood produced experimentally

* Bulletin 810. European Foulbrood, U. S. Department of Agriculture, Feb. 26, 1920. The Bulletin was prepared primarily for the beekeeper, but others also in studying the bee diseases, may find it useful. Those who may be interested, particularly in the more practical portions of the paper, can well omit the parts of it which are technical.

decade and a half this germ was quite generally supposed to be the cause of the disease. On account of the work by these Europeans, the name European foulbrood has been used as one of the names for the disease. In America, the name "black brood" was used for a while for this disease, but

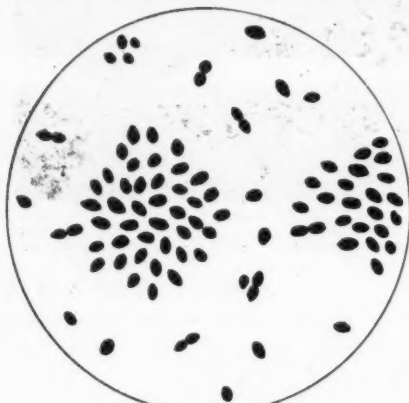


Fig. 2. *Bacillus plauti*

it was soon found, from a study of the condition, to be the same disease that had been studied by the English workers and considered by them to be "foulbrood." There was no further need, therefore, for the name "blackbrood," and it was dropped.

The name "stinking foulbrood" has been used in some countries for the disorder in which *Bacillus alvei* occurs in large numbers, and "sour brood" for the one in which *Streptococcus apis* is present in considerable numbers. The writer wishes to suggest that these are two names for one disease and that the disease is the same as the one for which the name European foulbrood is being used in this country.*

The term "foulbrood" has been used and is still being employed somewhat in a general sense meaning simply a brood disease. For at least 40 years beekeepers have recognized two kinds of foulbrood—one in which most of the larvæ die in uncapped cells and the other in which most of them die in capped ones. It is now positively known that these, instead of being two forms of one disease, are, in fact, two very different diseases. In this country they are being called Euro-

pean foulbrood and American foulbrood.

As both have the word "foulbrood" in them, one could easily be misled and interpret them wrongly to mean that they refer to two forms of one disease; as both diseases are found in Europe as well as in America, the names do not refer to their geographical distribution; and as it is not known in what country the diseases were first encountered, the names do not refer to the place from which the diseases spread. Since, therefore, these names are somewhat misleading and somewhat long, it must be admitted that they are more or less open to criticism. They need not cause confusion, however, if the above facts in regard to the diseases are borne well in mind.

Symptoms of European Foulbrood

The dead brood is mostly in uncapped cells; no dead pupæ are found, and the dead bees appear to be like those of healthy colonies. Since much of the affected brood is removed by the bees, capped cells are scattered among uncapped ones, giving to the brood-nest the pepper-box

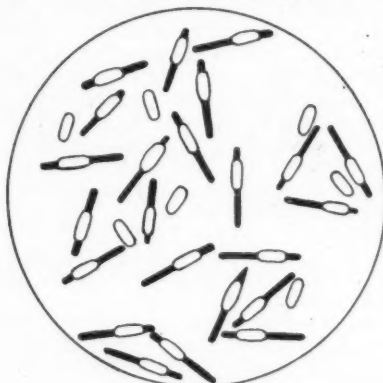


Fig. 3. *Bacillus alvei*

appearance (Fig. 1). The caps on cells which contain dead larvæ may (Fig. 5, P) or may not be punctured; the brood-combs are practically without odor; and the colony may be weak if much disease is present.

The larvæ, before death, (Fig. 5, A, E) lose somewhat the pearly whiteness and turgidity of living healthy ones (Fig. 5, D, F, I) and soon afterwards assume a yellowish tint. Later they take on a brownish tone, and still later this deepens often to a dark shade. The dead larval remains not infrequently occupy unnatural positions within the cell. Those dying while young usually lie on the bottom of the cell (Fig. 5, A, B, C, E) while those that are somewhat older occupy irregular positions on the floor (Fig. 5, G, H, J, L, M).* The remains of larvæ dying during the first two days after capping occupy irregular positions on the floor of the cell (Fig. 5, N, O), but those of larvæ dying later occupy a uniform endwise position (Fig. 5, R, S, T). There is a tendency on the part of adult bees to remove the diseased larvæ. This is usually done piecemeal

and in the infected colony, therefore partially removed ones are frequently found (Fig. 5, B, Q).

The decaying larval remains are not roapy, as a rule, only a small number of them possessing a viscosity that will permit the mass to be drawn out to the extent of an inch or so. This ropiness is more marked in the case of the older larvæ. When the dead larvæ are not removed they dry and become the scales (Fig. 5, C, R, T). As a rule these scales are rather easily removed. Those resulting from viscid remains adhere more closely to the cell wall than the others.

Experimental Studies on European Foulbrood

Much concerning the cause of European foulbrood, its spread, its diagnosis and the chances for recovery of the colony, has been learned from experimental studies on the disease. At the time the writer began his investigations of the bee diseases very little experimental work had been done on them and it was necessary, therefore, to devise methods for doing it. Those finally worked out were found to be very satisfactory. A brief description of them is given here, since by being acquainted with them the beekeepers will be aided in interpreting the results obtained.

A nucleus containing from 3 to 6 frames of bees, with brood in the uncapped stage and a queen doing well, was found to be a good colony for experimental purposes. The brood-frames are moved to one side of the hive-body and on the bottom-board on the other side are placed shallow glass dishes as feeders. The entrance of the hive is closed except for a space of about 1 inch on the side occupied by the frames. Any race of bees may be used, but naturally a gentle one is preferred. The queen should be clipped. The site for the experimental apiary should be broken up by small trees. The entrances of the hives in adjoining rows are pointed in opposite directions. Hives placed in pairs alternate with a single one. When in pairs the space left for the bees is on the side of the entrance furthest from the other hive. The inoculation feedings may be made at any time of the day, if there is a good or fair flow of nectar, but during a dearth it is advisable at times to inoculate in the evening just before darkness. By these various means, it will be ob-

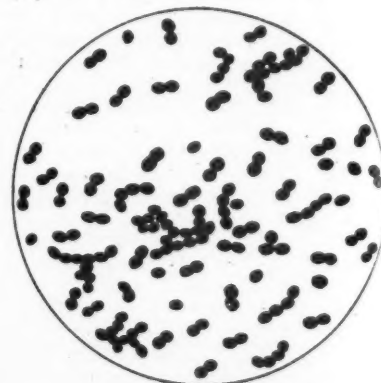


Fig. 4. *Streptococcus apis*

*The name "stinking foulbrood" for European foulbrood must seem to the beekeeper of America to be somewhat misleading, since it is American foulbrood that is the foul smelling disease. The origin of the name is briefly this: From the work in England, *Bacillus alvei* was thought to be the cause of a brood disease having a foul odor. When, therefore, *Bacillus alvei* was encountered in a brood disease by investigators on the continent of Europe the disease was naturally supposed by them to be one with a foul odor and was referred to by the name "stinking foulbrood." This name was used for the disease, to distinguish it from another one which did not contain *Bacillus alvei*, and the samples of which were without any marked odor. For this disease the name "non-stinking foulbrood" was used. This latter one was American foulbrood. (It is not unusual for samples of American foulbrood to lose the foulbrood odor quite soon after being taken from the hive). It must be remembered, therefore, in using the term "stinking foulbrood" that it does not refer to the disease which has the foulbrood odor, but to European foulbrood.

*These abnormal positions of larvæ as seen in samples of diseased brood are due, to a considerable extent, to the shaking used in removing the adult bees from the frames and to rough handling afterward.

served, the likelihood of robbing, swarming, absconding and accidental straying or drifting of bees is reduced.

In making the inoculations two methods were used. Those have been referred to as the direct and the indirect methods, respectively. Following the direct method, a group of about 10 to 20 larvæ, 2 to 3 days old, are fed thin sugar syrup to which has been added the contents of stomachs of sick larvæ. This is done by putting a very small quantity of the contaminated syrup directly with the food of the larva within the cell. For this purpose a small glass tube is used. Care must be taken that too much syrup is not added in making the inoculations, as the larvæ would be floated thereby. Care must be observed also that they are not disturbed mechanically by the tube. Disturbances of this kind are very likely to be followed by their removal by the adult bees. Within 3 days the inoculated larvæ show marked symptoms of the disease, some of the sick or dead ones are removed by the end of the third day and most of them before the end of the fourth day. Only a few are found infected outside the arena of brood inoculated. The colony usually speedily recovers from the infection and no further evidence of the disease is seen.

By the indirect method the entire colony is inoculated through feeding it about one-third of a pint of sugar syrup to which the crushed bodies of from 5 to 10 larvæ sick or dead of the disease have been added. The first symptoms of the disease are observed about 3 days after inoculation. The youngest larvæ to show symptoms are about 4 days old. After a single feeding the colony usually soon recovers from the disease. Other factors being equal, the recovery is more rapid when the amount of brood is small in proportion to the strength of the colony, when the flow of nectar is good, and when the bees are active.

A stock of fresh disease material is needed during most of the experimental studies, and this can be secured from colonies inoculated for this purpose. In inoculating these stock colonies the disease material for the first feeding is taken from samples received from the beekeepers. Repeated inoculations are needed, as a rule, to keep the colony diseased, as there is a marked tendency for the colony to recover from the infection. The material for these subsequent inoculations is taken from the stock colonies themselves. For the first inoculation the direct method is used, and for the subsequent ones the indirect method is employed.

It is only after repeated inoculations have been made and the disease has been in the colony for some time that the rubberlike scales (Fig. 5, R, T) are found that resemble in many ways those of American foulbrood. As these scales are somewhat difficult for the bee to remove, the number present naturally increases to a

certain extent during the course of the disease. The number encountered in any given area of brood-comb, however, is always small. The bees allow some of them to remain in the brood-comb for a considerable period.

Some of the experimental colonies that were rather heavily infected, but which remained sufficiently strong to winter well, were found to

be diseased in the spring, but some were not. Those that were only lightly infected, as a rule, did not show the disease the next year. Whether the germs used had previously been in a diseased colony has given the writer no uneasiness. All hives which had housed a European foulbrood colony were flamed inside before they were used again.

(To be Continued)

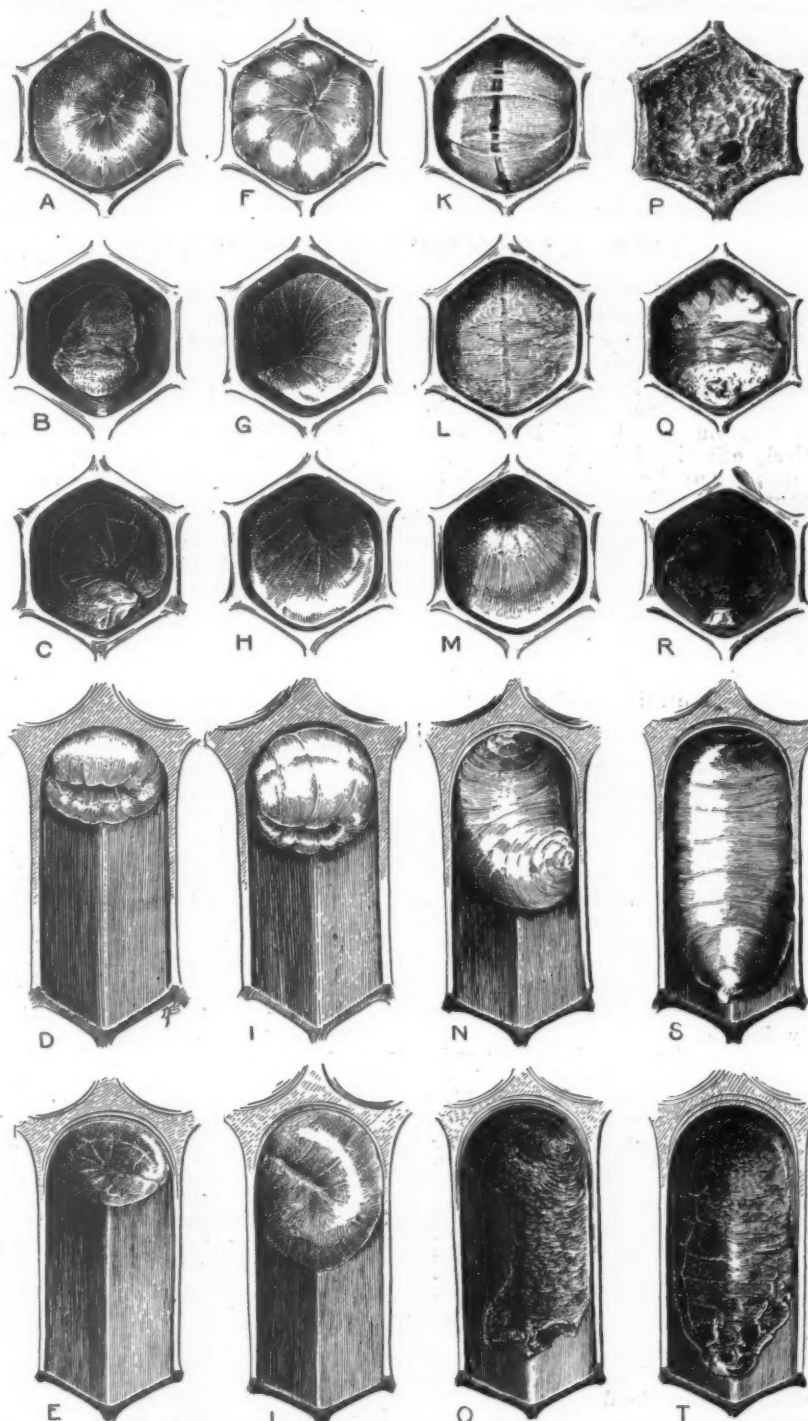


Fig. 5. European foulbrood. A to M uncapped, and N to T capped brood; D, healthy larva at the earliest age at which symptoms of the disease appears; A E, young larvæ showing symptoms of European foulbrood; B O, larvæ partially removed by the adult bees; C, scales from young larva; F I, healthy larvæ somewhat older than D. G H J, dead larvæ of the same age as F and I; K, healthy larvæ slightly older than F, with dorsal side turned toward the observer; L M, dead larvæ about the same age as K; N, larva dead at the time of spinning; O, scale of a larva similar to N; P, a punctured cap; Q R S T, larvæ which had assumed the endwise position in the cell before death; Q, larva partially removed; S, larva dead of the disease; R T, end and ventral view, respectively, of European foulbrood scales of larvæ of the age shown in S. These scales and those of American foulbrood are quite alike. The caps from N O Q R S and T were removed by the adult bees.

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THE EDITOR'S VIEWPOINT

Classification of Honey For Freight Shipment

Beekeepers will be charged higher rates for shipments of honey by freight in many localities, according to the new Supplement to Freight Classification No. 1, which becomes entirely effective July 15, 1920. Arguments presented at hearings on these proposed rate increases were only partially successful. The beekeepers were represented by the G. B. Lewis Company, Dadant & Sons, and the A. I. Root Company. The authorities made it plain that the increases were necessary because of improperly packed shipments of honey by careless beekeepers, with consequently increased presentation of freight damage claims.

Southern district comb honey rate on carlots is given fourth class. No previous rate was given this item, which may indicate greater freight movements of comb honey in the south.

Extracted honey rates were also largely increased as follows:

1—In metal cans, completely jacketed, L. C. L. western, first class; previously fourth.

2—Similar honey, except in boxes, L. C. L. western, third class; previously fourth.

3—Bulk in tight hardwood barrels with eight metal hoops, L. C. L. southern and western, now third class; previously fourth.

4—Same in metal cans, completely jacketed, carlots, southern, fourth class; first classification ever given.

Reductions were secured only on honey in glass or earthenware packed in barrels and boxes; carlots, southern, first to third class, and on granulated honey, carlots, in boxes over metal, southern, now fourth, previously third.

Good Samaritan Fund

We are still getting subscriptions to the Franco-Belgian relief fund. The following remittances have been received since the last statement:

L. W. Derrin, Cushman, Ore., \$2.50.
Montgomery Co., Pa., Beekeepers, \$5.00.

Twenty of the queens were ordered to France and Belgium. But trans-

portation is so irregular yet, that both Dr. Phillips and Dr. Miller advise against sending queens now. They write in a similar strain from Europe. So the balance of the queens subscribed will probably be sold in this country and the proceeds sent over in cash. There is still a big margin of exchange. All the news indicates that the people living in the devastated regions are still sheltered in iron-covered shacks or cabins of the most temporary description.

The Bee World

After what appeared to us as discouraging delays, the Bee World, of the Apis Club, of Benson, Oxon, England, finally reached us, 3 numbers—March, April and May—in one. But this number is worth while, 68 pages, replete with information.

We have never seen a bee magazine with so much "meat in the cocoanut." We are not in the habit of doing any advertising for anybody, not even for ourselves, in the reading columns. But we believe this magazine should be sustained. To secure it, you must be a member of the "Apis Club," and this will cost you 7s 6d. Some years ago it would have cost you \$1.87, but at the present date English values are low and you can probably get a draft for the above amount for about \$1.50.

The last number gives a splendid review of beekeeping periodicals in all countries. Why not make it a quarterly review?

Georgia State Beekeepers

Our esteemed friend, J. J. Wilder, editor of the "Dixie Beekeeper," is announcing a Georgia State Beekeepers' Association. We wish we had heard of it sooner, so as to help advertise it. We hope there will be a good attendance. No better man than J. J. Wilder can organize a thing of this kind.

Obituary—Paul Scheuring

Mr. Paul Scheuring, of De Pere, Wisconsin, who died lately at the age of 74, was one of the extensive beekeepers of that State. He came from Europe with his parents in 1849, at the age of 3, and lived in De Pere the en-

tire 71 years. He had as many as 6 apiaries. Of late years he had reduced his interest to a single apiary. He wintered 135 colonies in the cellar the past winter. But because of his bad health, he was unable to attend to them properly, and came out of winter with only 45. Mr. Scheuring was an 8-frame hive man and harvested some excellent crops. He filled several public offices and, at his death, the flags of the city building were put at half-mast. We are told one of his sons will continue his beekeeping.

Tunis Beekeeping

Slowly, but steadily, the bee magazines that were compelled to suspend circulation by the World War, are coming back to life. We are in receipt of the revived "Bulletin de La Societe d'Apiculture de Tunisie," its 56th number, published in Tunis.

Tunis, a French colony, in northern Africa, is quite a bee country. A large bulletin, entitled "La Tunisie Apicole," was published in 1912 and mentioned in the American Bee Journal in October of that year, with photos of a Tunis school of beekeeping. The writer and teacher, J. Georges, is still the manager of their editorial activity. Success to them.

U. S. Publications on Bees

To be had from the Division of Publications, Department of Agriculture, Washington, D. C., as long as the supply lasts.

Control of American Foulbrood. E. F. Phillips. Free.

American Foulbrood. G. F. White. 15 cents. Technical paper.

A study of the behavior of bees in colonies affected by European foulbrood. Arnold P. Sturtevant. 5 cents. Technical paper.

Michigan Meetings

The beekeepers of Michigan are to have their summer meeting at Boyne City, July 28 and 29, and I have promised to do my best to be there. And now comes the Huron County Association with a meeting, July 16, of the 3 counties of Huron, Sanilac and Tuscola, at the home apiary of David Running, one of the most expert beekeepers in Michigan. It is a great temptation, and I am going to try to make the two meetings, though they are 12 days apart. I will surely find something to do between dates.—C. P. D.

Chenango County, New York

The beekeepers of Chenango County are announcing a summer meeting and basket picnic at the apiary of George S. Hard, Norwich, N. Y., July 22. Their program is fine, but we received it too late to give it here. They are to have Dr. Geo. H. Rhea, of Cornell, and are to give several demonstrations and essays, with question box, discussions, and two lunches. That is the way to go at it. Many more such meetings should be organized, and the Journal will be glad to give them a notice.

Metal Combs

"Why don't you say something in the Journal about metal combs, which are so extensively advertised? Are they good, or bad?"—A Reader.

It is not our custom to say anything in the reading columns about patented articles which are advertised. But in this case, there seems to be a universal interest, that requires a statement.

However, it will take more time to test these combs in a satisfactory manner. But we can point out the probable advantages and defects.

A metal base in comb was invented long ago. A beekeeper of Toledo, Ohio, whose name is not now available, sent to us, some 40 years ago, two sheets of foundation made of tin-foil dipped in wax and laminated to give them the print of the cells. Those two sheets were put by us into a hive and forgotten. We have never seen them since. Evidently the bees built comb upon them so that it would have been necessary to mark them to recognize them further. So we know that bees will work on metal if it is slightly coated with beeswax. But we have never thought of any advantage in this kind of foundation, for it would cost more than the other and, with a little care, we can secure perfect combs with all wax.

As to the full metal comb, we can see a big advantage in its being able to withstand the extreme heat and the weight of the bees, if the swarm accepts it. We can also see a large saving of beeswax and the avoiding of any drone comb, where it is supplied.

Other advantages are the possibility of boiling diseases of the brood, as well as moths, out of it. Whether the boiling out of the bees' cocoons, in very old combs, is possible too, is an open question which only long practice will solve. Moths will probably not work on them much, as only the small larvæ of this pest could worm their way through the interstices that exist from one cell to another in the metal comb. But they would riddle them enough to make the boiling out advisable.

The disadvantages are, first of all, the high cost. If you render the wax of the combs of a colony and send that wax to a foundation factory, you can have the entire set of foundation for that colony for about the price of one metal comb added to the value of that wax.

Possible disadvantages lie in the great conductivity of the metal for

heat and cold. In a country where the temperature is constantly warm, as California or Texas, this objection has but little weight. But we are told by a beekeeper of Montana, and also by one of California, that brood has been chilled to death in these metal combs, in cool nights. This requires further and protracted tests.

The last disadvantage lies in the possibility of damage to the metal comb. A wax comb, if damaged by accident, in extracting, transporting, mice gnawing, or otherwise, will be readily repaired by the bees. But a metal comb, once damaged, is wasted. Neither is it necessary that the entire comb be damaged to make it worthless. Who would want to keep, in a hive, one or more combs in which say ten per cent of the cells could not be used either for brood or honey? We have before our eyes one of these combs, damaged on one side, beyond repair, by mice that gnawed it to eat the honey it contained.

After two or three years of experience with these metal combs on a fairly good scale, beekeepers will be better able to pass judgment upon them. Try them yourself.

When we think the matter over, we wonder whether some material exists that might be moulded into cells, which would be of a non-conducting material and could be repaired easily when damaged to large or small extent. Reviewing the different ingredients of human ingenuity and of natural origin, we find one that answers the purpose well—beeswax.

An Australasian Beekeeper and Publisher

During the last week in May we had the pleasure of a visit from Mr. W. S. Pender, beekeeper, manufacturer, and editor of the "Australasian Beekeeper," from West Maitland, New South Wales, Australia. Mr. Pender, whose magazine is now in its twenty-first year, was visiting America for information and enjoyment. He left Australia on the 12th of March and did not expect to return until July. The only thing which he did not like about his trip was the length of the sea voyage. He was 24 days on the way, without a stop, his first stop being Panama. He landed in New York, visited some of the leading manufacturers and beekeepers of our country, called upon the bee experts at the Bureau of Entomology at Washington, and from Hamilton was going to Denver, then to California, by way of Colorado Springs, visiting Manitou, the Garden of the Gods, Pike's Peak, the Grand Canyon, etc. He spent several weeks in California, and at the time when this Journal ap-

pears will be on the sea again for his return home.

Mr. Pender is a well educated man and a lover of natural history. We were sorry that the country roads were in such bad condition that we could not take him to some of our outapiaries. We were quite interested in hearing him speak of their country, where winter occurs during our summer, the months of June and July being the coldest they have. However, at West Maitland there is very little cold weather, only heavy frosts for a month or two, and they grow many tropical fruits. The bee business there depends mainly upon the eucalypti, as has been shown by the interesting articles which have appeared, from time to time, in this magazine, from the pen of Tarlton Rayment.

In summer they suffer greatly from heat and drought, the thermometer ranging up to 116 for several weeks. So they have their troubles, as well as we have.

Perhaps it will astonish some of our readers as much as it did us, to learn that Australia, which appears to our people from here as an insignificant island somewhere in the Pacific, has an area equal to five-sixths of the United States, that its length, from north to south, extends 28 degrees, from the 11th to the 39th, south; while the United States extends only 24 degrees from north to south, from the 25th to the 49th, north. We might know all of this, for it is on the maps, but we are so accustomed to consider the country in which we live as the greatest in the world, that it requires a special occasion for us to realize that we are not nearly so big as we think we are.

Australia is an up-to-date country, in beekeeping as well as in agriculture. "The Australasian Beekeeper" is a live publication and always makes interesting reading. They do not keep bees in "skeps," as they are still doing here in some of our States, in Great Britain, France and the other countries of Continental Europe. They realize that if they are to keep down diseases, they must have movable frame hives. It is time all our people understood it.

Melilotus Alba

"L'Apicoltura Italiana," in its April number, contains an article on sweet clover, by our Italo-American beekeeper, D. Barone. He explains that the origin of this clover is in Asia, and that for that reason it is often called "Bokhara clover," Bokhara being in Turkestan. He mentions what E. R. Root and Frank C. Pellett have written about it and its great value in the United States.

The Italians call this clover "Melilotus albus." They are indeed more correct than we are in the use of Latin names. The termination "us" of melilotus is masculine, the termination "a" of alba is feminine. We should call the plant *Melilotus albus*, or better, as a neuter, "*Melilotum album*." Our scientific names are a farce.

SECURING GOOD COMBS

BY FRANK C. PELLETT

ONE of the most difficult things to impress upon the novice, is the importance of good combs. To save a few cents' worth of foundation it is the common practice to use a narrow starter. While this may secure a straight comb, it is likely to be composed largely of drone cells. Unfortunately, an article designed to explain the need of full sheets of foundation is not likely to reach those who need it most, for few of them read the bee magazines.

The writer has had occasion to examine hundreds of hives in the capacity of inspector and is fully convinced that if it were possible to place all the bees on the farms of America on full sheets of foundation, this alone would greatly increase the output of honey by eliminating a large proportion of the useless drones now reared. So much has been written on this point that it seems like useless repetition to state that bees left to themselves will build large quantities of drone comb and that instead of a large force of productive worker bees the colony will largely exert itself in rearing drones which are a tax on the colony.

In hiving swarms it is well if possible to use one or two drawn combs in the middle of the hive to give support to the cluster. Where full sheets are placed in all the frames, the weight of the swarm will often break them down. In the June issue of this Journal, F. W. Luebeck, of Indiana, tells how he hives swarms on foundation by placing an empty hive-body under the one containing the frames with foundation. The bees cluster under the frames at the start until the combs are partly drawn. Through an error Mr. Luebeck's name was omitted from his description of this method.

When a swarm has a young and vigorous queen, they will sometimes draw out combs composed almost entirely of worker cells. The explanation lies in the fact that the queen fills the cells with eggs as fast as they are built and it keeps the bees hustling to keep ahead of her. Since the queen is young, the bees feel no need

of supersedure, and consequently have little use for drones. As soon as enough combs have been built to supply the needs of the queen for egg-laying, drone comb is likely to be built.

We have lately received from A. H. Perring, of Bloomington, Indiana, a set of combs which show very effectively what happens when the beekeeper fails to control conditions within the hive. The pictures herewith tell far more than the printed story.

Figure 1 is nicely fastened to the bottom bar, and aside from the large area of drone-comb it is a serviceable comb. Such a comb can be used in the extracting super if an excluder is used to keep the queen below. If the queen has access to it, sooner or later it will be filled with brood and a crop of drones will be reared in the large cells. Most practical beekeepers melt up such combs to avoid possible use by the queen. It is cheaper to permit the bees to build a new comb on a full sheet of foundation than to allow them to rear a crop of drones.

Figure 2 shows a comb composed almost entirely of drone-cells. Where the bees build from starters or without foundation, they are likely to build drone-comb, unless the queen is crowded for room in which to lay. In neglected apiaries a large portion of the combs often look like this. The

larger cells require less wax and apparently are easier to build, hence the bees prefer to build drone comb rather than the smaller cells required for worker comb.

Figure 3 shows a great waste of both wax and room. This comb is so badly gnarled that about one-fourth of its area is useless. Such uneven combs are common where no foundation is used.

Figure 4 shows the result of transferring naturally built combs without selecting those of worker cells. This appears very uneven and composed very largely of drone cells. Such a comb is almost worthless. It might be used temporarily in an extracting super, but when such combs are allowed to remain in the apiary, there is always danger that the queen will find access to them and fill them with brood.

Figure 5 shows a good comb which has been damaged by moths. The bees, in repairing the moth-eaten space, have filled it with drone comb. Even this amount of drone cells is sufficient to condemn this comb. It is expensive business to rear drones, and it is safer to build a new comb than to allow this to remain in the hive.

At figure 6 we see what happens when the honey is cut from the top of a comb and a portion returned to the bees. In this case the bees were robbed in the good old-fashioned way, even though they were in a modern hive and the combs built on foundation. Of course the honey was in the upper portion of the comb and, this removed, the bees proceeded to rebuild the missing portion with drone cells.

Good beekeeping lies in intelligent control of conditions by the beekeeper. Langstroth's invention of a frame surrounding each separate comb, enabled the beekeeper to reach any part of the hive at will. The invention of foundation insured, not only straight combs, but combs composed mostly of worker cells. Good combs are one of the first essentials to successful beekeeping.

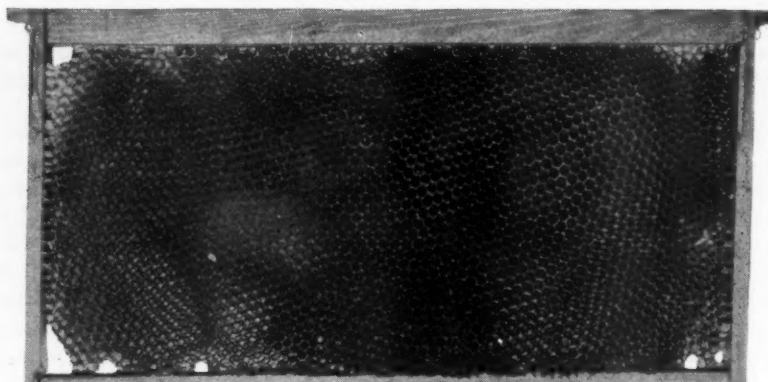


Fig. 2. This comb is built without foundation and is composed almost entirely of drone-cells

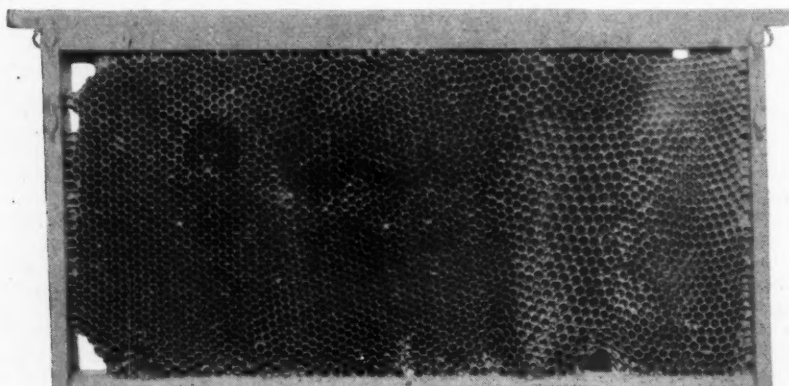


Fig. 1. An area of drone-cells spoils that which would otherwise be a good comb

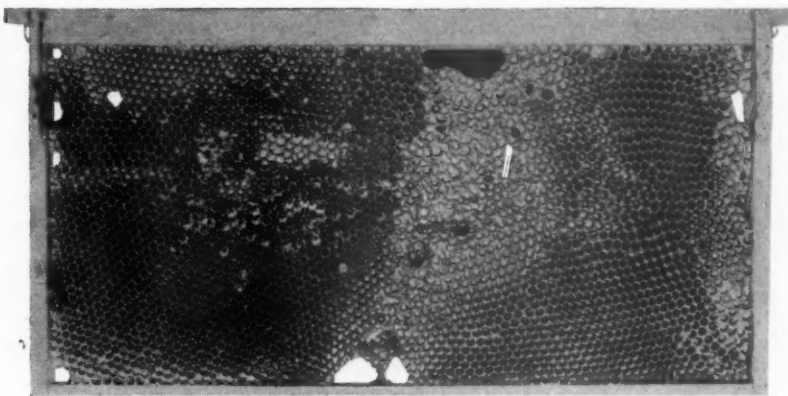


Fig. 3. Such gnarled space is a great waste of storage

Troubles of the Publisher

Never has the publisher found it more difficult to meet the problems of the day than at present. Every month brings some rise in price in some commodity that enters into the making of a magazine. We have continued the same old price at which the American Bee Journal was published for many years past, thinking that the present conditions were temporary and that prices would decline. Rise after rise has continued until we now pay more than four times as much for the paper on which the Journal is printed as we did when we took over the Journal. Our engravings cost three times as much and everything else in proportion. We have tried every possible way to meet these extra costs without increasing our subscription price. Hundreds of other publications have suspended because of inability to meet the situation, while most of those still continuing have raised the subscription price.

Conditions now are such that \$1 per year is not sufficient to pay the cost of publication of a journal like ours, and if the present high costs continue we will be compelled to increase our subscription price, as many publications have already done. We propose to wait a few months longer in the hope that prices of material will fall. In the meantime all our present subscribers will be given an opportunity to renew for as long a period as they wish at the present rate, \$1 per year, 3 years for \$2.50 or 5 years for \$4. We are already receiving a large number of 3 and 5-year subscriptions from those who wish to take advantage of the present low price.

Beginning With Bees

By H. C. Cook

I am of the opinion that the amateur is somewhat neglected. Generally the papers and lectures are a little too advanced for him, so I decided to let him get technical data and instructions from text books, and I would call his attention to a number of things he should and should not do.

Don't attempt to get into the bee business in a rush. Take time enough to learn the game, or your mistakes will be so numerous you will become

discouraged. Most amateurs attempt to make increase too fast. They weaken their stock to such an extent that so many bees are lost during the winter that in the spring they are about where they commenced, which, to say the least, is a disappointment. Go slow and learn how and when to increase. As a rule it is better for a beginner to confine himself to producing honey. Sell the honey and buy bees for increase. This will give him an opportunity to study the bees, and then he can make increase at a time when it will cost him nothing, and rather, be a benefit to his honey crop.

Don't be led astray by the stories of men who imagine they are beekeepers. In later years you can look back, as I have done in several instances, and see that they know but little more than yourself, but were simply passing around information which generally turns out bad in the end.

Get some good text books, study them carefully, and apply them to your work. Don't try two or three men's ideas at the same time. Any one of them, perhaps, would bring you out to success, but mixing them may prove disastrous. For instance, Mr. Doolittle, in his method of working bees, tells us to have the hives full of honey in the spring, and the bees will take care of themselves, while on the other hand Mr. Alexander, equally as good an apiarist in every way, tells us that the key to success in honey production is spring, or stimulating feeding. He says it is a good plan to extract all the

honey in the brood-chamber after the 15th of May, and feed it back. Now, either of these plans will lead you through the season to a honey crop, but if you mix them, you may do the wrong thing at a time when it would prove to be worse than to have left the bees alone. In other words, the bees may have been better off without your assistance. Never do anything to the bees unless you know why you are doing it—that is, anything you do to the bees is wrong unless you know the reason for doing it, and what you may expect from the manipulation. Don't make the mistake that is very often made by beginners, of trying every sort of hive on the market. Take some **successful** beekeeper as a guide in the sort of apparatus to use, and have everything in your yard interchangeable, so that any piece you pick up will fit on any hive in the yard. It is very disagreeable, when you are in a hurry, to find that your hive and super are not the same size. You have to hunt up another super—or perhaps you have none in the apiary to fit, and the loss of time and the worry will make you wish you had paid strict attention to this matter.

Don't attempt to raise queens before you have made a success in raising bees. You must first know how long it takes an egg to hatch, how long it is in the larva state, the length of time in passing from an egg to a bee, how long to hatch drones, and how long to hatch a queen, and then you must know under what conditions the bees will raise good queens. Good queens are the foundation to a successful apiary, and, as a rule, I think, for a time it will be to your financial advantage to buy your queens from some reliable breeder.

Don't take any chances with bee diseases. American and European foulbrood are so widely spread over the country that every beekeeper must be very careful. A very slight mistake may cause you a great deal of work—and possibly the loss of your little apiary. Never leave any honey where the bees can get it, as this is the way the disease is transmitted from one colony to another. Study up on this subject carefully, and I repeat emphatically, **take no chances**. If you discover this dreaded disease in your yard, don't become

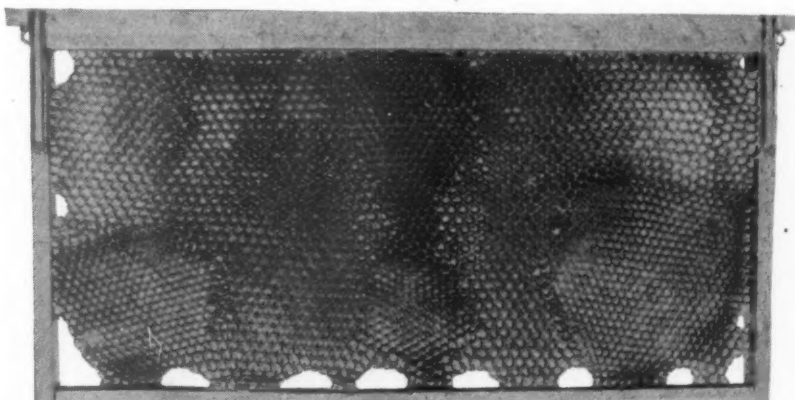


Fig. 4. Natural built comb transferred without selecting the portion composed of worker cells

discouraged. Just go to work and clean it up—follow carefully every detail of the instructions for curing the disease, and you will soon come to the conclusion that it is not so bad after all. Continual watchfulness is the secret of success in handling this disease. It has one advantage—it soon puts the careless, slouchy beekeeper out of the way, so it has a bright side after all.

Don't worry over reverses. We all have them. Just brace up and go at it a little harder. Hard winters and bad seasons are the exception rather than the rule in this locality; there is more sunshine than cloudy weather, and if you stick to your business I am sure you can make it pay you at least a good living with less labor than anything you do on a small capital. An amateur beekeeper is not a commercial beekeeper, but he should be a faddist in every sense of the word, and if so, his enthusiasm will be unlimited, and he will become a commercial man later on. If he is of the right material he will want to talk bees in preference to anything else.

The amateur should study all the phases of putting his product on the market, to entice the purchaser to pay him the maximum price. Cleanliness and attractiveness will accomplish this. The containers and labels should be tasty, and show your product off to the best advantage. For instance, a purchaser is willing to pay a little more for honey in a nice glass jar than for a tin can. He wants to see what he is getting for his money. Amateurs are usually dependent on the local market, and a man's success depends largely on his reputation, so he must never sell anything as first-class unless it is. Better tell the customer it is a little off, but the best you have at the time. Have him taste it, and usually he will buy and be perfectly satisfied.

Amateur beekeepers are usually the ones styled "back yarders" by the bee journals, but these are the ones who are the originators of most of the inventions used by the larger men. The back yarder is constantly studying the bees, as they are his hobby, and often stumbles onto some excellent appliances.

There is one thing he should never overlook, if he is a town beekeeper, and that is, to be in good standing with his neighbors. The best way to do this is to sweeten them. When

the honey is taken off, give nearby neighbors a generous sample, and always send the finest you have. This will sweeten their disposition towards the bees, and will make them good boosters for your product.

When the man with a few bees gets a good crop it frequently happens that he becomes afraid of not being able to sell out, and cuts the price, or does not keep posted on the market, and sells his goods too cheap. A man told me only a few days ago of buying 300 as nice sections as he had seen, at 20c, and at the time the market was \$8 per case, or 33 1/3c. Now, this man lost the difference and spoiled the market.

Make preparation in the winter for the coming season. Don't be afraid of having a few more supplies than you would ordinarily need. They will not spoil, and if the honey-flow is good you will need them, and if you did not have them on hand, perhaps you would lose more honey than you would have paid for the extra supplies, or perhaps the bees will swarm for lack of room. It is a great annoyance to be short. I know, for I have experienced it. Usually at such times, when you send a rush order to the supply house, the goods come in bad order, are delayed in transit, or the order is mixed up, so that you can't use them, and then you are liable to say things which I will omit.

The things that I have referred to in this paper are things that most men know, but don't think about, and I am merely calling your attention to them as an evangelist calls attention to your sins, so that you may be benefitted in the future.

Nebraska.

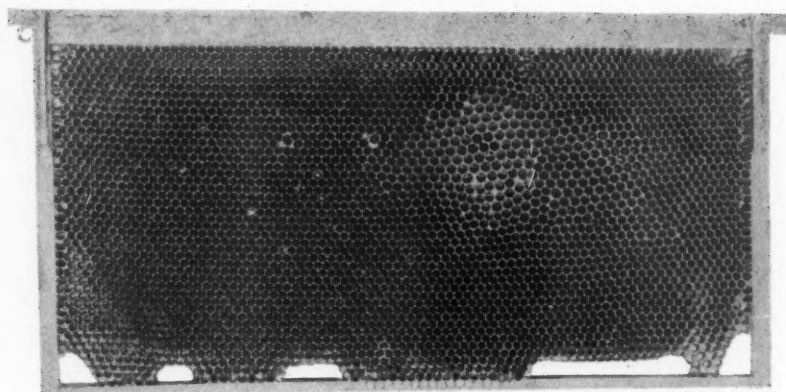


Fig. 5. In repairing a moth-eaten place in a good comb the bees have rebuilt it with drone-cells

Don't Get Caught

Sugar is extremely high in price and is hard to get in quantity at any figure. Beekeepers who have always depended upon providing sugar to feed any colonies that might be short of stores, had better be extremely careful about extracting too closely this year. The safe plan is to keep plenty of combs of sealed stores to carry the bees through the winter always on hand and not to depend too much upon later flows, which may fail. For the first time in recent years honey is selling in many places cheaper than sugar. The beekeeper who extracts too closely and has to replace the honey with sugar will lose money on the transaction, even though he does not lose his bees from starvation through failure to secure the needed sugar.

Fifty pounds of sealed honey for each colony on October 1 is not too much for safety. A cold, backward spring may follow a long winter. With the uncertainty of the sugar supply, the wise beekeeper will retain a liberal supply of honey when selling his crop.

Increased Honey Production—What to Do With It

By O. E. Timm

During the past few years much has been said and done towards increased production. In Nebraska there has been a substantial increase in the number of colonies and the amount of honey produced, but it is as nothing compared to what is going to be produced in coming years. A majority of the Nebraska honey producers are young men, which means that they will be ready to support any program that will make the honey producer's income steady and reliable.

Under existing conditions, our beekeepers have great difficulty in disposing of more honey than their neighbors will buy. A demand must be created for the additional honey to be produced. I have personally retailed out several tons of honey and I realize the difficulties. Firms must be found that will handle our product more easily than we can do it ourselves. It appears to me that the honey producers' associations thus far are only trying to replace the

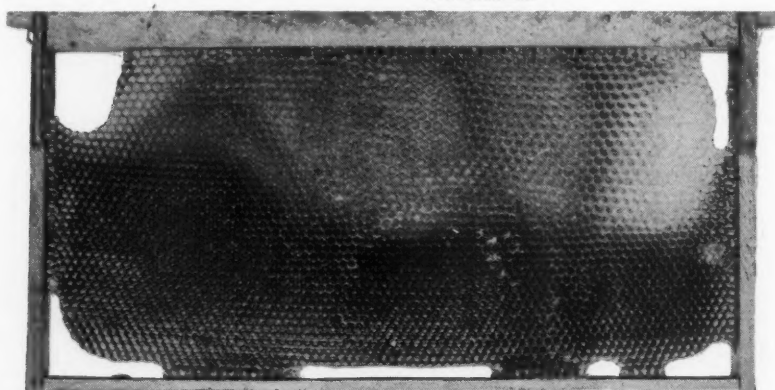


Fig. 6. After a portion of a good comb had been cut away, it was rebuilt with drone-cells

brokers, expecting to pay the brokers' profit in salaries to their managers. I don't want this to displease any of these people, but I think a more economical way would be to put our honey in the hands of practical brokers who know how to handle farm products.

Nebraska honey, in my estimation, is equal if not superior to the average of western honeys. It ought not to be difficult to give it a name by advertising. Is there a better time than this for it, when sugar is selling at 30 cents per pound? We can increase the demand by spending a little money in advertising Nebraska honey, as the orange producers have advertised "Sunkist Oranges."

I know of a brokerage firm that could handle any amount of our honey, in carloads or single crates. They have a man who has had extensive experience for 10 years past, in grading honey. These people could handle our honey, keeping it stored in a warehouse, insured, as our property, until sold. It would be sold at an agreed price, settled upon through the Executive Committee of our Association. But we would have to agree not to sell any honey, either at wholesale or retail, except through them. Is it not better to dispose of our crop through the regular channels in this way than to go in the haphazard ways of the past?

For an advertising campaign, the same brokerage firm could be used. Our advertising would cost us but little, as we would secure through this firm the services of the papers in which the honey would be offered. Attractive labels, bearing the trade name of our honey, store posters, etc., would give us more advertising than we ever can secure individually.

Our members must bear in mind that **if they want a market for their surplus, they must create it themselves, by advertising**, and must have some systematic method of supplying the trade all the year round, which they cannot do individually.

During the month, the executive committee will hold a meeting and will work out this matter so as to have it in shape before the new honey is ready for the market. I would like to have a letter from each Nebraska man who reads this and get his views.

Some funds are necessary to put this matter in action. About two cents on every dollar's worth of honey that we produce would make quite a good sum. It may take \$500 to get the thing under way. But now is the time for us to let the world know that there is such a thing as the honey from which we are expecting to make a living.

Bennington, Nebraska.

Locality

By F. W. Osler

The beginner in bee culture, if a real enthusiast, will usually subscribe to one or two journals dealing with his pet hobby and in these will find the word "locality" cropping up with a regularity that is somewhat

surprising. That localities differ all will agree. The apiarist in California does not meet with the same conditions as the man in New York State, Canada or Texas, but beginners seldom realize that localities a few miles apart also differ and must be carefully studied if the best results are to be obtained. One thing that is absolutely necessary is a full knowledge of the honey and pollen-bearing plants in the vicinity and the approximate date of their bloom. When the bees begin to fly in the spring they should be carefully watched for the first sign of pollen. When this is seen coming in the beginner should make it his business to find out the names of the plants from which it came, the quantity in the neighborhood, its value as a honey plant and anything else by way of information that may prove of value. One of the best aids to this study is a work by Frank C. Pellett, "American Honey Plants." Covering the ground as it does from Northern Canada to Mexico, it is a book that fills a long-felt want and should find a place on the shelves of every beekeeper's library.

Bees use water for brood-rearing and will travel a long way to get it if not obtainable close at hand. In the cold, windy spring days many a worker bee is chilled and lost in the effort to find water. There is a dozen methods of supplying bees with water if your locality is short of this necessary help to brood-rearing. A tub filled with water, with the surface covered with cork chips, will answer every purpose, and if placed close to the hives, will save the bees many a long, cold flight.

That soil conditions affect localities is well known. Light, sandy soils warm up quicker in the spring; whereas clay soils, heavy with moisture and of close grain, respond less rapidly to the sun and wind. It naturally follows that a locality in a region of light soils would be best for the early breeding of bees and queens. On the other hand, the best honey-flows are generally found in a locality with a heavy soil.

The beekeeper cannot always choose his locality, but he can intelligently adjust his work to suit it, and so at least deserve success if he cannot command it.

That localities differ in honey-flows must also be considered. Here in Ontario, where clover is our most important honey plant, pussy willow, fruit bloom and dandelion aid materially in encouraging brood-rearing to build up our colonies in preparation for the main flow.

The fall flows vary both in quantity and quality. Aster, coming late in the fall, is somewhat of a nuisance; it is unsuitable either for winter stores or table use, but if saved over until spring a frame or two of aster honey can be slipped into a hive without exciting the bees and so save a lot of messy spring feeding. It takes a frame of honey to produce a frame of brood, so colonies found to be light in stores in the spring can be helped in this way.

Pollen has a value all its own. I

repeatedly see the question asked as to the best substitute for pollen and so gather from this that some localities are short of this important substance. Then, again, I know of beekeepers who cut solid combs of pollen out of the frames and melt them up, claiming that the bees never use one-half of what they gather. So I would say to the embryo apiarist: study your locality, visit the beekeepers near you; you will find them the greatest gossips on earth, always willing to talk bees and tell what they know, and sometimes what they don't know, but good fellows just the same. Toronto.

Fastening Foundation

By Geo. F. Webster

I was considerably interested in reading Mr. A. C. Miller's article in the May issue of the Journal (page 165) on "Stretched Foundation and Sagging Combs," and while I agree with most of his points, I do wish he would "forget" that "brush" as well as the "wonderful wax-tube" and use the despised "spoon" for the melted wax (yes, and forget the rosin, also).

Having had occasion to fill a good many frames with foundation lately and time being very precious, I adopted the following plan with considerable satisfaction: Tilt the frame at an angle of forty-five degrees (more or less), pour the wax in the groove at the highest point, allowing it to run quickly down, stopping it just before it runs off by reversing the frame (one soon becomes quite expert at this). This will be found to be much more rapid than the paint brush and does a much neater job.

Now, if we could get our supply manufacturers to leave the top-bars plain (that is without any groove of any kind) we could save nearly a quarter of an inch of the expensive foundation by putting it in place and embedding the wire, then place a piece of wood $\frac{1}{2} \times \frac{1}{2} \times 16\frac{1}{2}$ in. with an offset at each end, upon the opposite side, then pour on the wax as mentioned above. This "wax-stick," as I call it, is easily held in place by the thumb of the left hand while the wax is being applied.

Now, if you want real nice, solid combs you can put in a bottom-starter and the bees will (if the frames are given to a strong colony during a good honey-flow) make good use of them by filling the frames solid to the bottom. They should be placed above the brood.

Now, if someone has a better, quicker plan, let's have it, and criticisms invited.

Sioux Falls, South Dakota.

The Dreamers

I knew a good lady, who in her girlhood, when at school had read Virgil (his fourth book of the Georgics), who, as many know, writes charmingly of bees which hummed, oh, ages ago, on the Sabine hills. Virgil was a beekeeper, but he was, higher still, a poet, and all the crooked wisdom

of bee lore and the fond, foolish fancies of hundreds of years before him, he re-minted in a golden currency and immortalized—the silly things as well as the wise—forever.

The lady in question had a lovely garden, good soul, and the pleasant nonsensical things of Virgil hummed in her head until she finally decided to embark on beekeeping. A straw-domed hive it should be, because it looked more picturesque! She consulted her friends—but not me—as to a handbook, a modern one, on beekeeping. So she bought Maeterlinck, which she enjoyed reading almost as much as her great Latin master, and felt set up for the task. Of course, what happened was, the bees had their own sweet way, did what they liked, and lived and enjoyed themselves, much as wild bees would in a wood. There was no honey on the breakfast table, not, at least, from the picturesque, dome-shaped hives. But she did not mind; they formed a pleasant feature in her well-ordered garden, blended with flowers and grass walks and summer sunshine. I feel I ought not to reckon my gentle lady friend with those who should not keep bees. They were part of her fair Paradise and became it. Utilitarianism is an abhorrent thing. God made fair sounds and scents and colors. God made butterflies as well as bees; and so in the scheme of things there is a place, apart from all thought of profit, for the straw-dome hive and the unmo-lested bee, set in a garden fair.—Rev. A. A. Evans, in the Sussex County Herald, England.

Honey for Baking

By Kenneth Hawkins

One of the biggest boosts for the use of honey in cooking appears in the May issue of the "Bakers' Weekly," a magazine of national distribution devoted to the interests of the commercial baker. The author, Chas. A. Glaubau, after reciting the chemical composition of honey and its better food value than ordinary sugars, gives several recipes for the use of honey in baking.

The following table for a "batch" of dough to make 141 loaves of bread is repeated for Journal readers:

Flour, 100 lbs. at \$12 per bbl.....	\$6.00
Water, 56 lbs.	
Salt, 1¾ lbs., at .0075 per lb.....	.13
Yeast, 1½ lbs., at 30c per lb.....	.45
Lard, 2 lbs., at 23c per lb.....	.46
Honey, 2 lbs., at 17c per lb.....	.34
Malt extract, 1 lb., at 9c per lb.....	.09

Cost\$7.35

The same recipe using sugar and no honey made 141 loaves cost to the baker \$7.53.

The writer of the article is quoted as follows: "There is one form of sugar, probably the first kind of sweetening agent brought to mankind by nature, which will meet the many requirements of the baker. After considerable investigation it has been found that honey is very well adapted to replace cane sugar. Not only to replace cane sugar satisfactorily, but

give the finished product a very characteristic flavor, which is wholesome and desirable."

Moral: Beekeeper, see that your baker reads this, and get busy and furnish honey for this added demand.

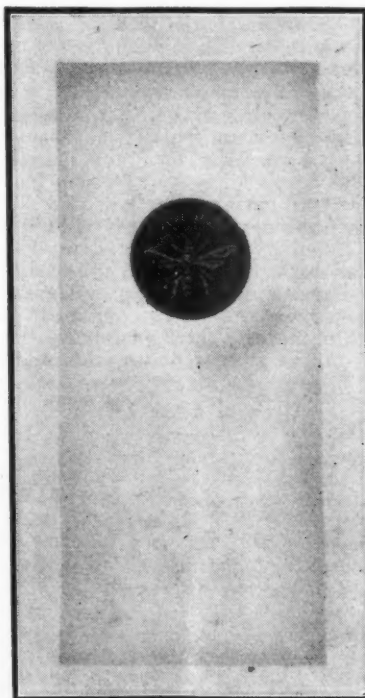
The Mid-West Show

It is to be hoped that the exhibits of bees and honey at the Mid-west Horticultural Show, to be held at Council Bluffs, Iowa, in November, will not be confined to Iowa. Indiana apple men carried off some of the big prizes last year and there is no reason why beekeepers from other States may not come in also.

There is a special prize for the best county association exhibit which should interest some of our live associations just now. It is not too early to begin making plans for this show. Those interested should write to Prof. F. B. Paddock, Ames, Iowa, for a copy of the premium list and for instructions for shipping exhibits, in case no one will be in personal charge. The Mid-West Horticultural show is a great exhibition of horticultural products and the beekeepers cannot afford to overlook the opportunity to advertise their product in this connection.

An Emblem for the Members of the League

At the National meeting at Buffalo, a committee was appointed to secure the making of a button or pin, of better quality and better finish than the cheap buttons thus far issued to beekeepers. This committee now reports that an emblem exactly like the cut accompanying this notice may be secured either as a pin or a screw-back button, in bronze or gold finish, which



Official emblem of the American Honey Producers' League

may be delivered to the beekeepers by mail at 80 cents, provided at least 100 of them are subscribed for. You need not send money till the buttons are ready. Just write that you want one.

C. P. DADANT, Hamilton Ill.

J. S. DUNN, Ridgeway, Ont.

S. J. GRIGGS, Toledo, Ohio.

Emblem Committee.

A Honey-Feeding Larva

By Wm. Cockle

Having set aside some frames of partially capped honey, I was much surprised when examining them in October to see that they were covered with what appeared at first sight as cobweb, but on closer examination I discovered a lot of small whitish larvæ secreted under the webs in the partially filled cells; where the cell was empty the larva was to be seen coiled up in the bottom, but in case the larva was feeding on the honey it had spun a web about one and a half inches in diameter over the comb and either rested on the web or under it. Observation showed that the larva reached down through a hole in the web to feed, but did not remain in the cell until all the honey had been extracted. In a few instances, when the larva had emptied the first cell it had pierced the wall of the adjoining cell, from which it continued feeding; though this was the exception and not the rule—most of the larvæ feeding from the top.

On October 14, finding that the number of larvæ was decreasing and that there were no signs of any pupæ, I removed the balance to a breeding jar, placing in it a little dry earth, a few dry leaves and a small block of comb honey.

When removing one of the larvæ from which to make a description, I took it up on the point of the knife with which I had previously cut the honey. It crawled over the honey without the slightest trouble; the stickiness did not appear to inconvenience it at all or to interfere with its progress; but they prefer to travel upon the dry comb or upon the mat of silk with which they cover the comb surrounding the cell from which they are feeding and in which they leave a small hole over the cell through which they feed.

During the succeeding months the larvæ spun tunneled silk passages all around the jar, extending them both through the comb and also down into the dry earth at the bottom of the jar. They covered the whole interior of the jar with a mat of silk as thick as a good sheet of paper, but could be observed through the glass resting in the tunnels; in these they passed the winter, and as they were kept in a warm room, they were never dormant, but appeared to be feeding all the time.

Description of Mature Larva

Length: 16 m. m.

Color: Cream; head light brown, mandibles and lower edge of cheek much darker brown; thoracic segment lighter than head; divided at dorsum, a dark brown splash at stig-

ma. Abdominal segments, with tubercles at 1 and 2, more or less brownish; hairs white.

Last abdominal segment with two-eyed brown rings at 2; from these the hairs are longer than those on the other segments; also a tubercle at 1, with a heavy brown spot, but not ringed.

Anal segment splashed with brown, which extends down to the vent; there are also 4 brown spots.

Feet, concolorous.

Pupa

Date of pupation not observed, but was probably during March. Color, light golden brown, slightly darker at head and anal segment; a row of raised brown tubercles on stigma, that on the second abdominal segment partially overlapping the upper edge of the wing cover; on the third the tubercle is just above the edge of the wing cover; on the fourth there is a secondary tubercle below and anterior to the major one; the anal segment is without tubercle and is armed with several short spines.

The pupa was enclosed in a white cocoon placed mostly within the tunnels. This fact was mainly responsible for the almost complete loss of the resulting imagoes, some of them being denuded of all scales in their passage through the silk mat, while others were damaged by contact with the honey, the net result being one male and one female secured for identification. The latter agree with some specimens named *Vitula serratilineella* by Dr. Dyar, though the bred specimens are slightly grayer and are not so contrasting in maculation. I am indebted to the kindness of Dr. J. McDonnough for verification of my identification. Quoting from his letter: "I think you will be safe in calling the species *V. serratilineella*, although personally I have never been satisfactorily able to separate this western species from its near ally in the east, *V. edmandsi*. The maculation is identical and the habits appear to be the same in both species, the only difference being that the western form is slightly larger. However, in view of the geographical distribution it seems advisable at present to retain the name *V. serratilineella* for the western form."

The habit referred to by Dr. McDonnough is the fact that *V. edmandsi* is a habitat of bumblebees' nests, in which it feeds. A description of this is given in Packard's "Guide to the Study of Insects."

Dr. Dyar, in Pro. U. S. Nat. Museum, Vol. 27, page 921, records having taken this moth at Shawnigan Lake, B. C., August 17 and September 4; while the Kaslo specimen that he had for identification was dated June 24. The dates of those in my collection are May 19, 29, June 7, 24, 29, July 9, 19, August 12, December 30; the latter taken in the house this winter.

Mr. W. L. Sladen, Dominion Apiculturist, writes me that he has never observed it and Mr. W. J. Sheppard, Provincial Apiculturist, also informs me that, although he has examined thousands of hives in British Colum-

bia during the past six years, he has not seen any evidence of it.

The conclusion is that this moth will only be found amongst stored frames or diseased colonies.

Since the above was written I am informed that lacking honey on which to feed, the larvæ will consume the combs; thus they are to be regarded as a pest.

Kaslo, B. C.

I have read with interest Mr. Cockle's account of the honey-eating caterpillar, and Mr. Malloch and I have looked up the species. It is quite different from either of our well-known wax moths. As Dr. McDonnough is an authority on this group of moths, his opinion that this species (*Vitula serratilineella*) is essentially the same as *V. edmandsi* carries weight and throws light on the subject; for *edmandsi* has long been known to feed on honey and wax in the nests of bumblebees, and might, therefore, readily transfer its attentions to combs of the honeybee.

This species of *Vitula* must be added to the list of insects affecting apiculture, though it is evidently of minor importance.

J. W. FOLSOM,

Asst. Prof. of Entomology.

Urbana, Ill.

Rendering Small Quantities of Wax

By F. Dundas Todd

Until last season, when it amounted to 39 pounds, my average annual wax production was about 20 pounds, so I never felt justified in buying a wax press and providing myself with the necessary paraphernalia for rendering. Each year I tried new methods for retrieving the wax, looking for the easiest way with a fair amount of efficiency. For several seasons I tried putting it all through in small lots in a small sack and found this tedious and mussy. At last I hit upon the idea that the best thing to do would be to get the slumgum all at one end, and so reduce this part of the work to a minimum.

The material I have had to handle for several years has been a mixture of old combs and cappings, but from now on the former will be at a minimum, as every spring I have been weeding out all drone combs, even from the extracting supers, as fast as I could get new combs built. When one is pushing for increase one hesitates to destroy a comb because less than a fourth of it contains drone cells, especially in a region that in most years is not favorable to comb building. Last season I got on an even keel, so I fairly well cleaned up every comb that was not pretty nearly perfect. It was the handling of these old combs that gave me the idea that I am now following.

The working of my own apiary is done on Saturday afternoons, and I hold open house for everybody. The work with the hives is usually done in about two hours, and all the time I am answering questions just as fast as a big, interested crowd can fire them at me. That part over we adjourn to

the honey house, where the catechism continues for about another hour, and by this time we are all due to start for the city. Any work in the way of repairs and such like that I do for the apiary must be done in the forenoon. In May I overhaul all old combs, destroying the poor ones, and as I find a chance render the wax. I have a kerosene oil stove, and on this I put a small pail with a few inches of water, then feed in old comb as fast as it melts. When I have about a gallon I find it best to proceed to the next operation, which is to strain it. In a hardware store I bought, for the sum of 40 cents, a wire sieve about 8 inches in diameter with wire handles, adjustable in length, such a sieve as a housewife uses for straining soups. This is adjusted on the top of another pail, and I pour the boiling wax through it. The slumgum that remains behind is dumped into a box before it has time to set. Then another batch is handled. A thin film of wax, of course, gathers on the wire, but it readily melts when the new hot batch is poured into the sieve.

Extracting in August is done Saturday afternoons. The supers are carried into the honey house in the forenoon, and there is generally a jam of people around while extracting is going on. The honey is run into the cans by the end of the day; the cappings are covered over to drain for a week. My first job next Saturday is to melt these and get them out of my way. Of course I lose a little honey, but I want everything cleaned up as far as possible before going at the end of the season to my home, which is about a hundred miles away. The wax product at the end of September is in the form of cakes of wax, that need to be remelted, and a box of slumgum. For final disposal, the latter is packed into 10-pound sugar bags, tied tight and brought to the boil in a pail. With a beater about 2½ inches square I work it pretty thoroughly, squeezing out the wax; then pour the fluid into a dish with flaring sides to set. The slumgum gets a final squeezing with the beater and is then dumped into a box, and another batch started on the way.

Here is how the system works out in practice. So as to get fair figures, I got the cappings thoroughly clean and dry. At the start I had 52½ pounds of cappings and old combs. At the first rendering by straining through the sieve I got 27½ pounds of wax, that is fully 50 per cent of the original weight, which, by the way, was a little better than I got in some experiments I made a dozen years ago with the solar extractor, and with the oven method. Working the slumgum through the sugar sack gave 11½ pounds, so that I got altogether 39 pounds of wax. To see if I could do better I put some of the slumgum through a second treatment, but got so little wax that the outcome did not seem to justify the labor. If I ever fall heir to an old clothes wringer I think my outfit would be complete.

When dry, a little slumgum is a fine help in starting a fire.

Advertise and Otherwise

By W. S. Pangburn

I am sending you photo of the honey display we put in at our district fair last fall. We spent about a week at the fair and arranging for the exhibit, and while we were very busy, not feeling we had the time to spare, after it was all over we considered it was time well spent.

The display, while gotten up on short notice, drew lots of attention, and we received many compliments.

We had plenty of "Facts About Honey" circulars, and it was surprising to me how many people carried them away after examining them, which showed they were interested. We think them the best thing of the kind that has come to our notice. There is something about them that attracts, and people will read them, and that is what we want.

We drove back and forth each day, and took all the 10-pound pails we could carry in the back of the Ford, and came back empty each night, and the last day we could have sold double what we had with us. We sold over 1,000 pounds of honey at the fair, and one merchant bought the entire exhibit, so we had nothing to bring home save what little equipment we had. We have since sold this same merchant \$250 worth of honey, and could sell him more if we had it. We have sold many other orders on the strength of the exhibit.

We had the opportunity to meet people face to face, get acquainted with them, and explain any questions they wished to ask about honey, and how it is produced, which isn't a bad advertisement in itself.

The quart jar, just above the cake

of wax, was chunk honey, and was much admired by all. I could have sold this jar a dozen times, and it revealed to me the possibilities of working this trade. This honey, packed in glass, surely appeals to the eye, as well as to the palate.

We have always worried about putting up this honey in advance of the orders, on account of our honey granulating so early, so we experimented last fall with a quart can of chunk honey to determine how long it could be kept without granulating. This can was packed the first of September, and the liquid honey heated to 140 degrees, and after cooling it was poured in the jar with the comb.

This jar has shown no signs of granulation until lately, and only shows slight granules in the bottom now, which proves this honey could safely be held 5 months without serious granulation. How fast it will go from now on remains to be seen.

I am convinced the granulation was started from the drip from the comb honey, which, of course, was not heated. If the comb honey was allowed to drain thoroughly before being placed in the can, it **might** prevent it from granulating much longer, but of course that would take considerable more time. However, if it would do this, we believe it would pay in glassed goods for the merchants, if one had trade enough to justify. Packed in 10-pound pails for family trade, it is doubtful if it would pay, as very few families buy enough ahead to last them until the honey would granulate.

The little hive of bees drew considerable attention, especially from the "kiddies," and I had to keep a close

watch on them. I never saw a "kid" that would refuse to stir up a bumblebees' nest or run a stick into a beehive, and then "beat it," if the opportunity presented itself.

Of course the bees were dead ones, mounted by setting them on a little spot of glue, and would not stand much punching. We had workers, queen and drone, to show the difference between them.

We believe, if more beekeepers would put a display at fairs and elsewhere, they would find it the cheapest advertising they can get. They would get direct benefits from it, and it would add greatly in putting honey on a level with other foods. It is up to us beekeepers to put it there. Are we going to do it, or let it drop back to the old level of prices that prevailed before the war? We hear considerable about the reconstruction, or destruction of prices. Do you think we can produce honey at 7, 8 and 10 cents per pound with bee supplies and labor at present prices? It can't be done and be a paying proposition.

If there ever was a time when beekeepers should wake up, that time is right now. Honey has, for a long time before the war, sold at unreasonably low prices. Many of us have wished we might be able to get the prices that some of the older members of the craft received years ago. We are now getting them, and while no sane man expects these prices to last indefinitely, we should do our best to prevent them going below where the production of honey becomes profitable. The beekeeper is just as "worthy of his hire" as any other worker. We have done much to relieve the shortage of sugar, and are entitled to a just and reasonable profit from our business. Are we going to work to maintain this profit, or are going to drop back into the old rut, and die on the job?

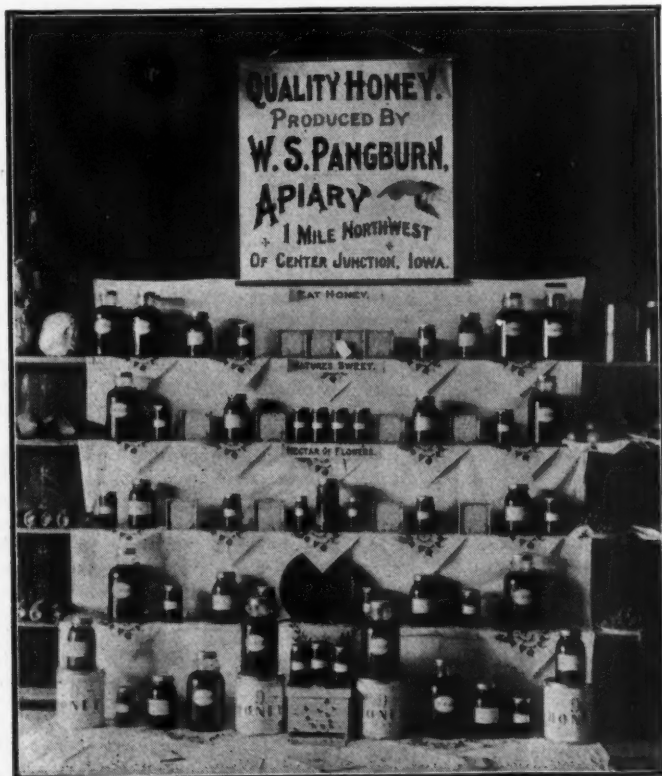
We have been talking to our trade for some time, that they cannot hope to buy honey as cheap as they did 4 or 5 years ago. Supplies and labor have doubled and trebled, and it would be unreasonable to expect it. Few people are so dumb that they cannot understand it when you explain to them in a businesslike way. There is only one way to keep our prices from going below where they are no longer profitable, and that is for every beekeeper to get alive to the situation, educate customers along business lines, create a demand for honey by advertising, which may be done in different ways, but do not lose your head and slash prices.

Iowa.

Costly Mistakes

By F. Greiner

How often have I wished that I might be in a position to begin my life work with bees over again how I would try to avoid the many mistakes made during this period of slow learning! Why cannot those who are coming on now profit by these mistakes made by us? The greatest mistake I



Pangburn's display

made in younger years—and I have not outgrown it now—is that I had too little faith in the business. I was afraid to invest capital in it—borrowed capital, if you please. This timidity manifested itself in various forms. For instance, it cost money to purchase comb foundation to fill the brood-chambers of our hives; but what of that? Would not a colony of bees be in much better shape for years to come with a set of all worker comb? Certainly it would, and the bees would repay in a very short time this expense. To raise comb honey without the use of full sheets of extra light section foundation would be the height of folly. None of that for me any more, although I have "economized" in this fashion for years.

A great many bees, and colonies of bees I have lost during winter by not giving them enough protection. The first book I ever read on beekeeping, written by Fr. Dzierzon, I found the advice given to "protect the bees by packing;" but it was expensive to build winter cases or double-walled hives, so we got along for years without protection, and most always lost heavily during winter. These losses, if expressed in dollars, would have bought the lumber for ten times as many winter cases or chaff hives. The present method of outdoor wintering demands very heavy or thick packing. Winter cases providing for 8 or 10 inches of packing cost lots of money; but let us suppose, for the sake of the argument, that the cost of a four-colony packing case would be \$10. If we have done our work well and have our four colonies in best condition in the fall, with sufficient stores in the large hives, we will have four rousing colonies of bees when May comes. Each one of these colonies will be better than four ordinarily wintered colonies and, as one of my friends says, may pay the cost of packing case the first year from fruit bloom alone. But should the weather be unfavorable during this period, we may divide each colony and then have a better lot of bees to gather the clover honey than we would have had we wintered ordinarily. Our crop would be sufficiently greater to pay for our packing cases twice over. Packing cases with lots of packing are one of the best investments of the beekeeper. Many of us do not know what well wintering means; many of us are pestered with poorly wintered colonies, year in and year out. We should do better; it is business.

The third mistake a beekeeper can make, which almost soured my whole nature, is to be contented to carry on beekeeping in a poor honey location. My young friend, get out! There are many good unoccupied fields; find one and stock it up to its full capacity. You will be better off financially.

New York.

Another Bee Bulletin

"Beekeeping for the Oregon Farmer," by Prof. A. L. Lovett, is the

title of a 24-page bulletin issued by the Oregon Agricultural College. Equipment, location and management are taken up rather fully for a bulletin of this kind.

Bulletins of the college are free to residents of the State who apply for them. Address College of Agriculture, Corvallis, Oregon.

Honey-Making Wasps

Through the kindness of C. S. Engle, the associate editor received a large colony of honey-making wasps belonging to the genus *Nectarina*, from Rio Hondo, Texas. These insects are common in the tropics, from Mexico to Argentine, but are unknown in the United States except in the lower Rio Grande Valley. We are showing herewith a picture of the big nest suspended in a burlap swing, in the cage in which it came by express.

These insects are a source of great curiosity to nature lovers, as they are unlike anything known in the Northern States. They make paper combs like other wasps, but store honey like the bees. When they sting they lose their stings, as do the honeybees, and they are said to swarm like the bees.

The colony is now established nicely beside the dining-room window, where the associate editor anticipates great pleasure in observing their habits during the summer months. They are working away, apparently as contentedly as though they had always lived there. We hope to be able to give some details of the habits of these interesting insects, later in the season, after there has been opportunity for studying them at close range.

They were left in the window of a local store, for two days after their arrival, before being released, and were the source of much speculation on the part of those who saw them. The following comments are from the

Hamilton Press, the local paper:

"Mr. Frank C. Pellett received from friends in the lower Rio Grande valley recently a hive of honey-making wasps. The little beggars look innocent enough, but would surely start something if they got loose. They were securely kept from mixing promiscuously with the landscape by a tight wire netting. The peculiarity of these wasps is not only that they make honey, but that they make their comb out of paper, which they manufacture themselves. The hives, if they may be so called, look like big hornets' nests. The habits and plans and ambitions of these wasps are little known to the scientific world and it will be Mr. Pellett's summer job to get on visiting terms with his visitors and tell their story to the world. If he can induce them to lay off making honey and produce news print, he will write his name on history's scroll in larger type than did old man Gutenberg or any of those old-time guys who first put printing on the map. If he can't get 'em to make news print he might earn our undying gratitude were he to turn 'em loose on the paper profiteers. It would be a pleasurable experience for the printer to see those grafters jump to safety with the same alacrity with which we have to jump to get a bundle of paper on which to print our engines of energy. Sick 'em on 'em, Pellett."

Dandelion a Secondary Honey Producer in England

J. J. Kettle, who writes the "Dorset Yarns" in the British Bee Journal, has this to say of the dandelion:

"In a pasture field close to the farm there are thousands of dandelions, which is figured in Root's A. B. C. and X, Y, Z of Beekeeping as a fine bee plant. Here there is not a bee to be seen on them, yet before the fruit blossom opened they were on



The nest of honey-making wasps as received at Hamilton

the early flowers on warm banks. This flower is singular in its habits—it only opens when the sun shines and rain is not coming. A field may be quite yellow for an hour or so, and then they close up; they open that the ligulate flowers, which are crowded together in one calyx, should be fertilized when pollen is quite dry and the pistillate organ is ripe for inoculation.

"A lot of these ligulate flowers, like the thistle, hawkweeds, etc., all go through the same revolutions. The salsify family always close up at 12 o'clock, and is called "John go to bed at noon," but it will only open when the climatic conditions are favorable; they go to sleep at night, and many of them bend over the flower heads, as men do in prayer—but this is digressing. Bees seem to have the get-rich-quick fever, and leave the flowers where stores are short for the flowers where abundance reigns. If it is so at our farm and other gardens of Dorset, we may assume it is general everywhere."

British Bee Journal of April 19, 1920.

Experiences of a Novice

By C. E. Knight

I don't know whether my experience the first year, as a novice, would cause even a smile with the older heads.

As a diversion, to take my mind off my work, it was a success. As to knowledge gained, I think it was more than a success, and from a financial standpoint, I think I am ahead. A year ago the first of October, I purchased a stand of bees. There was probably 10 pounds of honey in the hive. The heartsease was in full bloom, and beside filling the lower part of the hive, I took off 14 pounds from the super.

I put a box over the hive, filled in about 3 inches of straw and left it on the summer stand.

The first and only swarm came off May 3. I put them in a new hive on the old stand and moved the old hive to one side.

All I had was 1-inch starters, and for fear they would swarm out while I was at the office, I put a queen trap on. I never had occasion to use the trap, but supposed all standard traps were made for ordinary bees.

Imagine my surprise, if you can, on returning home to find the mesh full of dead bees, and the inside of the trap full too.

You better believe I used a file vigorously on that trap.

The queen laid a few eggs, but like the joy had all gone out of life.

The first of July I made up my mind there was something the matter, and on examination I was unable to locate the queen. I therefore took a comb of brood, from eggs to sealed brood and placed it in the middle of the hive.

Three days later I looked in and found three fine cells started, with plenty of royal jelly.

I have read bee books from one end to the other to find out what hap-

pened, but I do not find a thing that looks just like my case.

You take a piece of ice cream, put it in a thimble and let it melt, and you have it as near as I can tell.

I thought I had foulbrood, but upon examination I decided I did not have it.

Every egg and everything up to the sealed brood had melted, but the sealed brood proved to be O. K.

The sun shone on them about one hour, around 2 p. m., but nothing like it happened before or after.

I immediately sent for a queen and introduced her in the regular way, and in a few days everything was moving finely and they gave me 27 pounds of honey in the supers.

The honey flow was just enough to stimulate brood rearing, with very little surplus, so about the first of July I took a hive with full sheets of foundation and placed it on the old stand, taking one frame of brood with the queen and put them in the new hive. I placed the old hive on top of the new one without queen excluder, and both top and bottom entrances open.

It was a comparatively short time until the bottom part was full of brood.

I sent for a queen, and about two days before I thought she would arrive, I set the top part of the hive down, moving the bottom part about one-third its distance to the north and setting the top part right against it on the south.

In three days after the queen was received she was out and at work. I took off about 25 pounds from the new hive and about 40 pounds from the old hive and about 50 pounds of extracted from all and left enough to take them through the winter nicely.

When sweet clover began to bloom, last summer, there was what I called a big black fly, about as big as a big green blow-fly, that swooped down on the white clover, literally by the millions, and as long as they staid the bees did not touch the sweet clover. They disappeared in a night, as suddenly as they came, because, I suppose, all the nectar was gone, for the bees worked very little on it afterward. As I said, the flies were big and black, and had white rings around their eyes.

The heartsease and fall honey plants were nearly a failure here, in fact the whole season was a failure.

Summing up, I think I did remarkably well for a greenhorn. Will some one kindly tell me what was the matter with that comb of brood?

Iowa.

(This must have been a case of overheating. We had dozens of similar accidents, in the old days, before we learned how to increase ventilation for summer days.—Editor.)

New Manager for California Exchange

Mr. Justice, the former manager of the California Honey Producers' Exchange, has resigned, as already announced. C. E. Millspaugh has been selected as his successor. The new

manager has had eighteen years' experience in the marketing of bee products in America and foreign countries. It is announced that the Exchange will inaugurate an active campaign to secure facilities for collective marketing, such as are already enjoyed by the citrus, raisin and other co-operative organizations of California.

Dope for Bee Stings

I think I have found an immediate relief for bee stings in a mixture of spirits of camphor and tincture of iodine, as follows:

Spirits of camphor U. S. P. 6 drams
Tincture of iodine U. S. P. 2 drams
Glycerine 10 drops.

If applied at once it will, I believe, stop pain and prevent swelling.

A. F. BONNEY.

BEEKEEPERS BY THE WAY

A Beekeeper From Kentucky

So far in our brief notes concerning beekeepers of note from various places we have not had much to say about men from Kentucky. However, it is not from lack of material, for there are some good beekeepers in that fine old State of diversified crops and climate. Porter C. Ward is one



Porter C. Ward

of the best known Kentucky beekeepers. The fact that he was selected as President of the Tennessee Beekeepers' Association while living in another State, is the best evidence of his popularity. Ward is both a farmer and a beekeeper, but the bees hold first place in his affections, and we hazard the guess that when he decides to lay aside one of his lines it won't be the bees.

Bees Among the Ruins

Epehy, Meuse, April, 1920.

"Returning in 1917 to the ruins of my village, I suddenly heard the hum of a honeybee. It was working on the blossoms of a willow. I stopped and wondered. I might have asked her: 'Where are you from? How is it that the barbarians have not killed you? Has the Creator given you the trust to restock our deserted villages?' Mystery! The following day, about 200 yards from this spot, I heard a roar. I saw a number of bees about the ruins of a roof. I had discovered the colony, lodged in a spot of difficult access. It was probably this circumstance which had saved it. I secured a basket and a few rags and soon had them in my possession. The combs were suspended crosswise of the entrance in the angle of a ruined roof. A large drone-comb, 28 inches in diameter, was at the back, with smaller combs diminishing towards the front.

"The next day I put them in a ready-made movable-frame hive, filling two frames with pieces of brood. Later I transferred them in a D.-B. hive, and gave them a super, which they filled.

"We were the first people who came back to our village. I was astonished to see the number of willows growing through the ruins. The tussilagos (colt's foot) were also there in large numbers, the white sweet clover and the yellow, the epilobium (willow herb), all growing spontaneously in the plain of uncultivated land.

"I have since bought 4 fine colonies from Mr. —, whom I thank heartily for the fine manner in which he filled my order."—(Bulletin de la Suisse, May, 1920) Auguste Despagne.

(This reminds us how much misery there is still to be relieved in those unfortunate countries.—Editor.)

Combless Packages Versus Wintered Colonies

By Wallace Park

Apicultural Investigations, Iowa Experiment Station.

During the past two seasons, the Apicultural Section of the Iowa Experiment Station has run a comparative test on package bees and wintered colonies for the purpose of determining their relative value in honey production. We offer the results obtained as a report of progress only. The two seasons differed greatly, as did also the results obtained; and next season may give still different results. Conclusions reached are tentative and subject to modification, should future results warrant a change.

In order to determine the comparative value of package bees and wintered colonies, we must know in each case (1) cost and (2) production.

Cost of Wintering

The cost of wintering is made up of (1) stores consumed (2) packing cases (or cellar) and (3) labor. During the winter of 1917-18, colonies

wintered in quadruple packing cases consumed an average of 20 pounds of stores between the close of the fall flow and the beginning of the spring flow. This quantity, at 25 cents per pound, was worth \$4.60. The cases used were of the type recommended by the United States Department of Agriculture and were built at a cost of \$15 per case. They should last 20 years, but with average care perhaps 15 years would be more nearly their lifetime. This means a depreciation of about 7 per cent per year, which, added to 8 per cent for interest on investment, totals 15 per cent. Then 15 per cent of the original cost, or \$2.25, is the cost of one case per year, and one-fourth of this, or 56 cents, is the share of each colony. The packing material used was fine mill shavings. Allowing for a little wastage each year, 12 cents per colony is about the cost of the shavings. Thoroughly dried forest leaves would be just as good, but probably would not be any cheaper, considering the labor of gathering them.

The labor cost for packing and unpacking will vary greatly, depending upon equipment and system, or the lack of them. While it is said to be possible for two men to pack 100 colonies per day it is estimated that the average number packed by two men would not exceed half that number. With labor at \$5 a day, 20 cents per colony would seem to be a reasonable cost for the labor of packing; and unpacking costs about the same so 40 cents per colony is allowed for labor of packing and unpacking.

Then the total cost of wintering for 1917-18 was \$5.68, with perfect wintering. But in general, a winter or spring loss of one colony in ten may be expected. It would cost \$56.80 to winter 10 colonies, and if one dies, the cost is still \$56.80, which must be apportioned among the nine remaining, and one-ninth of \$56.80 is \$6.31.

During the winter of 1918-19, and average of 27 pounds of stores was consumed, an increase of 7 pounds over the previous winter. But the market price was slightly lower this year, so 27 pounds at 20 cents gives \$5.40. By referring to the accompanying table it will be seen that the cost of packing cases and packing materials was greater than in the previous year. The cost of wintering in 1918-19 was \$6.66 per colony with perfect wintering, of \$7.50, with a loss of one colony in ten.

Cost of Packing Bees

A 2-pound package with untested queen cost \$5 delivered and installed on combs the first year, as against \$6.25 the second. But a loss of about one package in ten might be expected, so each of the remaining nine would cost \$5.55 in 1918 and \$6.72 in 1919.

Gains

The first season, the packages arrived the last week in April and were installed on drawn combs containing some stores. They made an average net gain of 40 pounds as against 60 for the wintered colonies. The pack-

ages arrived the first week in May the next season and made an average net gain of 103 pounds, as against 133 for the wintered colonies.

Comparative Value

To compare the value of the package bees with that of the wintered colonies, it is only necessary to divide the cost of the bees by the number of pounds of honey produced in each case, and then make direct comparisons. (See table.) We have, then, in each case, the cost of producing a pound of honey in so far as the cost of the bees alone is concerned. It must be borne in mind, however, that these figures do not represent the total cost of production. If we desired to determine the absolute cost of production, it would be necessary to include interest on all capital invested, depreciation of equipment, and labor through the entire season. But these items would be essentially the same for both package and wintered colonies, and can, therefore, be omitted in determining comparative values.

For the first season, which was a very poor one in this locality, wintered colonies produced honey for 3½ cents per pound less than the package colonies. The second season was probably a little better than the average for the locality. Wintered colonies produced honey for approximately one cent per pound less than did the package colonies. The average for the two years shows a difference of 2¼ cents in favor of the wintered colonies.

General Considerations

In 1919 cold, wet weather from May 16 to June 12, greatly hindered brood-rearing in all colonies, but especially in the package colonies. The main honey-flow came on before the package colonies had a chance to build up. There was no late flow of any consequence.

In 1919 there was no real period of dearth from the time the packages were installed until the middle of September. Some of the package colonies stored surplus from basswood. The wintered colonies, however, were stronger and stored much more from this source. A late honey-flow enabled the package bees, which had just reached the peak of production, to pile up a substantial surplus, while many of the wintered colonies stored only a moderate amount at this time, due to the fact that they had passed the peak of production earlier in the season.

Conclusions

In a locality where there is a light honey-flow during the early part of the season, with the main flow coming in the fall, package colonies may be expected to be as profitable as wintered colonies. Only under the most favorable conditions can package bees be expected to store much surplus from an early honey-flow.

Unfavorable conditions during the building-up period in spring, retard brood-rearing in package colonies more than in wintered colonies.

Results so far indicate that package bees cannot be relied upon to take the place of wintered colonies,

altogether, but that they may be profitably employed to replace winter losses or to make increase.

Combless Packages Vs. Wintered Colonies

	'17-18	'18-19
Wintered Colony.		Cost.
Stores consumed in wintering	\$4.60	\$5.40
Packing cases	.56	.71
Packing material	.12	.15
Labor of packing and unpacking	.40	.40
	\$5.68	\$6.66

An expected loss of 1 colony in 10 brings total to—\$6.31 \$7.40
Package Colony.

2-lb. package, untested queen, delivered \$4.75 \$6.00
Labor of installing in combs .25 .25

\$5.00 \$6.25

An expected loss of 1 package in 10 brings total to—\$5.55 \$6.72

Net Gain

Wintered colony 60 lbs. 133 lbs.
Package colony 40 lbs. 103 lbs.

Comparative Cost Per Pound Produced

Wintered colony 10.5c 5.5c
Package colony 14.0c 6.5c

*Does not include interest on investment, depreciation of equipment nor labor through the summer.

(In our opinion, bees as carefully packed as the above were reported to be should not lose one colony in ten during the winter. Therefore we can put that much to the credit of wintered colonies. The above comparative statement is certainly very interesting.—Editor.)

A Honey Gate

By A. F. Bonney

The threading on the average commercial honey gate, as furnished in the past, will not fit the screw-tops of cans, and is, therefore, worthless. Make them yourself, in this way:

Cut a piece of heavy tin 3x5 inches and with a tinner's die cut a hole in the center 1½ inches in diameter.

Cut 1

Next bend the edges up three-eighths of an inch on either side.

Cut 2

Cut a strip of tin seven inches long which will slide tightly in the folds of No. 1. Fold the end to form a handle.

Cut 3

Now cut the screw-top from an old can and solder it to No. 1 by its upper edge, and the job is done. If you are not handy at this kind of

work, any tinner can furnish the article.

Cut 4.

Swarm Control

By W. J. Sheppard

Some method, or other, for the control of swarming, or, in the event of swarms issuing, the building up of colonies to pre-swarming strength, as soon afterwards as possible, is of paramount importance in honey production. Here in British Columbia, where we usually experience short honey-flows, there will be swarming galore as soon as honey begins to come in at all freely, unless some measure has been taken to check or control it, and so prevent the honey crop being curtailed, or, as sometimes happens, being lost altogether, through want of such precaution.

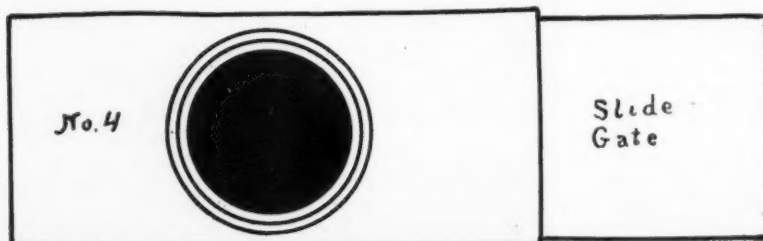
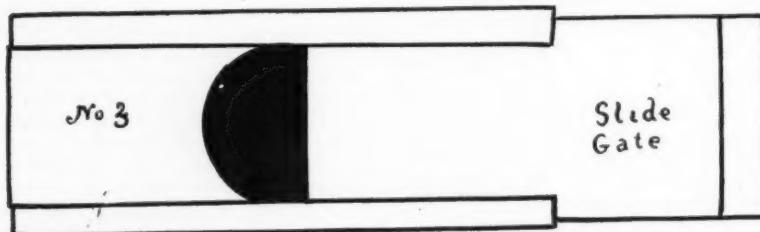
A simple method to check swarming, suitable to British Columbia conditions, is to place a second story of built-out combs, or, full sheets of foundation, above the brood-chamber, as soon as the bees begin to get crowded in the spring, adding supers afterwards, as required, above a queen excluder. This will provide the queen with abundance of room for egg-laying, giving her access to 20 frames in a 10-frame hive, and 16 in an 8-frame.

Needless to say, colonies will, by this means, become very strong, and be in the right condition to render a good account of themselves when the honey flow comes. The queen, after a short time, will ascend into the second story and make this her headquarters, so that, as a rule, there will not be very much brood below. Just before the commencement of the honey-flow the queen may be found and put down in the bottom story, below the all-wire queen-excluder. Then, as the brood hatches out, the bees will fill the combs with honey. It is advisable to search through the combs in the second story, on the ninth day after the queen has been put down, in case queen-cells have been built which should be destroyed, unless required for nuclei, or for requeening. Some prefer the excluder to remain on the top of the second story all the season, without troubling to put the queen down.

What is often referred to as the Demaree plan for swarm control is an excellent method and in favor with many up-to-date beekeepers. It is simple in application and can generally be relied on to give good results. As soon as the brood-nest becomes crowded, all the brood, except one or two frames, is placed in a second story over a queen-excluder, and the queen left below, empty combs, or full sheets of foundation being added to fill up the vacancies. By this means the queen is provided with abundance of room in advance of her requirements, the conditions being much the same as if she had been put into a new hive with a swarm. The colony, by this means, builds up quickly, so that there is a tremendous



No. 2



Bonney's home-made honey gate

working force in readiness for the honey-flow. It may sometimes be found advisable later on to repeat the operation of raising the brood into the second story. On the ninth day afterwards, it is necessary to examine the combs in the second story, in case queen-cells have been built, which should be destroyed if not otherwise required. Queen-cells are not so likely to be started if an all-wire queen-excluder is used instead of a zinc one.

Another method that has given good results in some seasons, when the conditions have been favorable, is to place the queen with one or two frames of brood in a second story, above a zinc excluder, leaving the remainder of the brood below. Queen-cells will then usually be built in the queenless part, and on the ninth day afterwards all but one are destroyed. After the cell that is left hatches out, as the young queen is below the excluder, she is able to fly out and get mated, so that there will be two laying queens in the hive. The old queen can be removed later and used for a nucleus, or, if she is too old for further service, can be destroyed. Queen-cells are more likely to be started below if a shallow super is placed between the two stories, using the two queen-excluders. By this means, if it proves successful, hives can be easily requeened each year.

With the adoption of any method to endeavor to prevent swarming there will doubtless always be a certain percentage of colonies that will swarm. In this case nuclei can be made by dividing up the brood-combs, giving two or three to each nucleus, taking care that each has a good queen-cell. The swarm can then be returned to the old stand, putting it on built-out combs, or, if these are not available, full sheets of foundation, leaving the supers in the same position as before. If increase is not wanted, all the brood can be removed and placed in a top story, above the supers, with a queen-excluder between, and the swarm returned below. If this is done a small opening may be left in the top story for a young queen to fly out and get mated, all queen-cells but one having been previously removed. The young queen, when mated and laying, can be used for replacing the old queen.

The liability to swarm is more pronounced, in spite of whatever method may be employed to control it, by the presence of old queens. Most beekeepers find that it pays best to make a rule of keeping only young, vigorous queens, and, when a good strain has been secured, to breed their own queens from their best colonies from year to year. Colonies headed by young queens go into winter quarters better and can be usually relied on to come out stronger in the spring than those with old queens, besides lessening the tendency to swarm the following season.

The provision of adequate ventilation is a very important item in the control of swarming. Overheating, through want of sufficient ventilation, will cause bees to swarm premature-

ly, sometimes even before queen-cells have been commenced. When this occurs, the internal conditions of the hive have become unbearable to the bees and have to be remedied quickly. Sometimes brood will be found to have died through lack of ventilation and consequent overheating. Too high a temperature within the hive will occasionally cause the combs to melt down and ruin the colony. Single-walled hives, on which the hot sun pours all day long, are more likely to be affected in this way than those protected with double walls or an outer case. In the interior of British Columbia we find that, with the hive-cases that are now so largely in use, and which have a packing of 3 inches all round, as well as underneath the brood-chamber, a summer entrance 1 inch deep extending along the full width of the hive is

sufficient, if porous coverings, such as sacking, are used above the frames. With single-walled hives this sized entrance is often insufficient, and additional ventilation is needed. This can be provided by pulling the supers forward to allow a current of air to circulate.

A Good Meeting

One of the largest meetings of beekeepers of recent months was that of the East Tennessee Beekeepers' Association in connection with the State Farm Congress held at the University at Knoxville in May. About 275 beekeepers were in attendance. The size of the attendance speaks volumes concerning the interest in honey production in Tennessee. Tennessee has a delightful climate and some of the finest people in the world.

DR. MILLER'S ANSWERS

Questions are answered in order received. As we receive more questions than we can answer in space available, two or three months sometimes elapse before answers appear.

Wintering

1. I frequently note the theory of wintering bees in two hives, a hive and super. I also note, in "Fifty Years Among the Bees," that two colonies may be successfully wintered in one 10-frame hive, cellar wintering. In actual practice, which plan is best? I like the idea of two colonies in one hive, because all my bees are summered in outyards. If this plan were employed, would it be of any advantage if the division board was partly of wire cloth for greater diffusion of heat and hive odor?

2. In setting a weak colony over a strong one in spring, Alexander method, is it best to use screen cloth for a few days between the hives, or is newspaper better? Will the bees have trouble and fight through the screen? The screen would be easier to put between the hives, especially on a windy day.

MAINE.

Answers.—1. It would be better if all colonies were so strong that there would be no object in wintering two of them together. But if you have two weak colonies there will be a gain in the matter of heat by having them in one 8-frame or a 10-frame hive with a thin partition between the two sides. I never tried wintering with one colony over the other, but think I should much prefer the colonies side by side in the same hive. For one thing, this makes it much easier to shift the colonies into two hives side by side in the spring than it would be if one colony were over the other. There would be nothing gained by having the partition partly of wire cloth, and possibly something lost. You don't want the same hive odor, as the colonies are not to be united, and there may be just a little danger of one of the queens being killed if there is any communication between the two sides. The bees crowd up against the partition at each side, forming a single cluster, and this they could not do with one hive over the other.

2. Haven't you got two things mixed? Newspaper is used when the two colonies are to be united. The Alexander plan in spring is to put a weak colony over another, preferably a strong one, temporarily, so that the weak one may have the help of the heat in building up. In this plan newspaper should not be used, and I rather think it would be better not to use wire cloth, using only the excluder and allowing the lower hive to stand uncovered a little while before setting the other

on it, and then putting on the excluder and upper hive as softly as possible.

Making a Living With Bees

I have now thirteen colonies of bees.

Do you think I can make a living in the bee business, and would you give me some of your good points, if you think there is a living in it for me? Our honey crop here is mainly white clover, which lasts from about June 1 to August 1. I have \$500 of money which I can use in the business. Should you think I can clear about \$100 net money per month for a living? PENNSYLVANIA.

Answer.—The problem is whether, with 13 colonies of bees and \$500 to invest in more bees, you can make \$100 a month, or \$1,200 a year. You might be fortunate enough to buy bees at about \$5.75 per colony, thus getting 87 colonies for your \$500. That, with the 13 already on hand would give you an even 100 colonies. If you should harvest 100 pounds per colony you would have a total of 10,000 pounds, and at 25 cents a pound that would bring you \$2,500, or more than double the desired \$1,200.

That's what might be. But it might be quite different. Even if you had the hundred colonies, and make sure of 25 cents a pound for all the honey you could produce, the yield per colony will always be an uncertain factor. Like enough it might be safe to count that in a series of years you would come out all right, for the years of failure would be overbalanced by the good years, but you have no way of telling when the bad and when the good will come; and suppose the first two or three years fall below the average, then where are you?

Your safe way is to continue the bees as a side line and drop all other things only when you get enough ahead so that you can stand a year or two of dead failure in the honey harvest.

Bureau Hive—House Apiaries

1. In the March Journal, just to hand, page 93, 4th line, 2nd column, I note reference to "Simmons' bureau hive." I would like to know about the "bureau" hive. I have never seen reference to it before.

2. Also about construction of "house apiaries," illustration of one being given on that

same page as used by a Massachusetts beekeeper.

GEORGIA.

Answers.—1. Simmons' bureau hive is evidently a hive of British Columbia, for our knowledge of it is as short as yours. We have no idea of its being anything valuable.

2. House apiaries are usually constructed as houses, with single walls and rows of hives on both sides. They are mostly used in crowded quarters, although some beekeepers, such as Mr. F. J. Strittmatter, of Ebensburg, Pa., use them on the farm. In Switzerland there are more apiaries in houses than in the yards. Hives are placed in one, two, and even three tiers. It is probably rather unhandy to have more than two tiers, as one has to use a step-ladder to examine the upper tier. The question of house apiaries was discussed at length in the March, 1917, number of the American Bee Journal. Their main advantage is in sheltering bees well for winter, while leaving them free to fly on warm days.

Good Crop—Moths

1. I started in last spring with 28 hives; got 2,100 pounds surplus chunk honey. How does this do for a short season, as it rained all the spring and was too dry in the fall?

2. When I began to put my crop on the market I would take off say 12 or 15 supers at a time, and stack them up in the dining-room for a few days, while I sold it out. I kept it covered up, but moths would get in the honey. How would you keep them out?

TENNESSEE.

Answers.—1. That is a very fair showing. I am told that Tennessee is not a very good State for beekeeping. But it is likely that some parts are good and some bad, just as in every other State in the Union.

2. There must have been some eggs laid by the moths on the edges of those supers before you took them in. It is not likely that moths would get into your dining-room to lay eggs, unless you do not have fly screens. When moths are plentiful, as they usually are in the late summer, they lay eggs about every crack, wherever they can smell the odor of combs. To destroy them, you may use either sulphur fumes or bi-sulphide of carbon. The former may be burned in the room in a dish. There must be enough to kill the flies in the room. The room is closed during the operation and opened afterwards. With the latter you must not have any fire in the room, as it is an explosive. Read what W. S. Pangburn says on page 90 of the March number. It cannot be improved upon.

Aluminum Combs

Would it be necessary to have at least one wax comb in a brood-chamber of aluminum comb so as to raise some drones?

CALIFORNIA.

Answer.—If you wish to rear drones especially from this one colony, it may be necessary to have one wax comb with some drone comb in it. Ordinarily, your other colonies will furnish sufficient drones for the extra colony on aluminum combs which you have.

Beekeepers Taxed

1. Explain why beekeepers or their bee supplies and bees cannot be assessed or taxed. I have had this explained but have forgotten it.

2. Do you know of any side-line beekeepers in Detroit who produce any honey for sale? I would like to get next to them. I am working in the city here and if I could, would like to keep my bees here until I get a better start.

Ernest C. Keenmon,

1023 Vermont Ave., Detroit, Mich.

Answers.—1. If you know of any way to avoid taxation of bees or bee supplies, you know more than we do. Some assessors do not tax bees or their products. But since we expect to get State help, and get it in many

instances, there is no valid reason why we should not help to pay the taxes.

2. Side-line beekeepers of Detroit who read this may answer you themselves if they see fit to do so.

Wintering—Swarm Prevention

1. Last November I banked all my bees in straw, 12 colonies in one row, 7 colonies in another, facing south. I first set them either on bricks or short pieces of 2x4's placing the hives about 4 or 5 inches apart and filling up this space with straw and then piling the straw on the north side and the east and west ends of the rows, about 2 feet thick, and on top about 1 foot thick, and weighting the straw to keep the wind from blowing it away, with short pieces of board and poultry netting, or anything I could get. I wintered 7 colonies successfully this way last winter. On March 2, 1920 bees were flying from every hive and throwing out dead bees that died during the winter. There is only a wood cover on any of the hives, made of seven-eighths pine board with a 1 inch rim on all four sides that fits snugly on the hive. Do you consider this a very good method of outdoor wintering? I make all my own hives, supers, bottom-boards and covers and use the Hoffman frames; hives all 10-frame size. Last year I tried mostly for comb honey, but this year I intend to do a little extracting. I am thinking of taking one frame out of the brood-chamber of each hive and spacing the other nine equally, so as to give better ventilation; then placing a full depth super on without any excluder, put the one frame taken from the lower chamber in about the center of the upper chamber or super with 8 frames containing full sheets of brood foundation wired in. 2. Will this method to any degree prevent swarming? IOWA.

Answers.—1. Yes, when bees have good stores and plenty of them and are placed where they can have a flight when the weather is warm, they should winter well with the shelter you made. The danger lies in bad food with too long winter confinement.

2. Your method will certainly help to prevent swarming, though it will not be an absolute swarm prevention.

Poisoned Bees—Opening in Hive Body

1. Would you kindly describe the looks of a colony of bees that are poisoned by fruit spray?

2. Also, where the augur hole should be in the hive-body above the old queen, so the young queen may take her flight, as advised by Mr. F. C. Pellett in a former issue of the American Bee Journal?

COLORADO.

Answers.—We are unable to describe the looks of a colony poisoned by spray, because we never had such a happening. But if bees die on the way home, or about the hive, without apparent signs of swollen bodies or diarrhea or dysentery, it may be poison. In all spring diseases of bees, such as May disease, paralysis, dysentery, etc., there is a swollen condition of the abdomen and ill-smelling discharges are noticed. However, sometimes the May disease brings about a constipation in which the offensive matter cannot be discharged. I judge that in a case of poison there would be no distention of the abdomen and no unhealthy discharges.

2. The opening for a young queen to pass through for her wedding flight should be in the upper compartment, above a queen excluder and with its entrance on another side than the flight opening of the lower hive. Otherwise the young queen might enter the lower opening and find herself in the same hive with the old queen.

Bees Dying

I am having some bad luck with my bees. Lost 2 nice swarms last winter; they had honey to live on. I find they all, or nearly all, are dead in their cells. I think they froze to death, for it was a hard, cold and windy winter, with lots of snow. For the last 4 or 5 winters I have not lost any, until this winter; they were well packed. I am troubled with mice. I caught 3 in one hive. I set the small house traps for them. Any suggestions

you can give me will be thankfully received.

NEW YORK.

Answer.—The bees that died in the cells have undoubtedly starved to death, although they may have been close to some honey. When the weather is very cold for several months they are unable to move sideways on their combs. They keep crawling up towards the top of the frames and finally die of starvation. During the past winter the bees in New York State, which had buckwheat honey and were confined a long time, suffered from diarrhoea, soiling their hives, and many of them died. In your part of the State bees winter better in the cellar than out-of-doors. Even colonies in large packing boxes died for want of an opportunity to take flight. Mice are, of course, injurious. But if the entrances are shallow enough, the mice cannot enter the hives and annoy the bees.

10 Frames Vs. 9 Frames

Having a born appetite for honey and none to be bought in my locality, I decided to try the bees for it. After thinking the matter over I decided to purchase nuclei from good beekeepers. In the spring of 1911 I bought five 3-frame nuclei with queens. I got one nucleus of Golden Italians on May 21 that gave me 3 supers of section honey. I got 2 nuclei of three-banded Italians on May 22. One gave me a swarm about the first of August, which was lost on account of my being away from home, and two supers of section honey; the other gave no surplus honey at all, but gave a swarm, August 20, which was saved. They filled their hive and gave ten pounds of surplus in two weeks. I received two nuclei on July 4, one gave two supers of section honey, the other one did not fill their ten frames. The last mentioned were Golden Italians. I have the six colonies of bees stored in the large basement under my dwelling house and they seem to be wintering nicely. I am thinking of using extracting frames and running for chunk honey instead of sections for home use and neighbor trade.

Would it be better for me to keep my hives full with 10-frames, or to use nine frames, giving wider spacing?

I have several trees of black locust and plenty of catnip and horehound which is ready for the bees June 1st, and all other plants adapted to northeast Missouri.

MISSOURI.

Answer.—The wider spacing is useful mainly in preventing swarming, as it gives better ventilation. But if you use 10-frame hives, the breeding space is none too large. If you use extracting frames in upper stories, and give your bees plenty of room, they may do well and not swarm too much with the 1 1/4 spacing.

Feeding Bees—Honey Plants, Etc.

1. Can I feed my bees with a sorghum syrup in winter or with sugar cane, or Karo syrup? Which will be best? Bees fly almost every day in winter.

2. When pine trees bloom do they yield honey? They have abundant pollen.

3. Are peanuts good honey plants?

4. How many pounds of honey do bees need in winter here?

5. What time does the heavy honey-flow come in this State?

LOUISIANA.

Answers.—Sorghum is death to bees in countries where there is any cold weather at all. It may do in Louisiana, but I doubt it. Karo is still worse, and in most instances the report is that the bees won't take it. They might take it if starving. Sugar cane syrup might be a little better.

2. We have never heard of honey from pines except as honeydew.

3. None of the works on bees and honey plants list peanuts as good honey plants.

4. Almost as much honey is needed for bees in the South as in the North, as they breed almost uninterruptedly. But your State is one of the least known as to honey resources.

5. We understand that willow blossom is an early source of nectar in Louisiana, and

that there is alfalfa, locust, tupelo, blackberry, etc. There are also plenty of sumac flowers. Study the flora of your vicinity and post yourself.

Beekeeping in the North

Do you think it profitable to raise bees, as far north as I live? There is a good deal of white clover in the pastures and also bass-wood bloom and red clover.

MINNESOTA.

Answer.—Yes; there are many beekeepers not far from where you are. We know of a beekeeper at Parent, close to St. Cloud, who succeeded well in beekeeping some 25 years ago.

4x5 Sections

I have been experimenting on bees for some years, and I started with the 10-frame Langstroth hives, everything new. I have equipped all my hives with the new No. 4 super, taking sections 4x5. (I bought these supers thinking I could use them for extracted honey, providing I should care to use them for that purpose). I produced some nice sections, but they are easy to turn over, and I believe I should like the 4¼x4¼ a little better, everything considered, but I could never use them for extracting supers if I wanted to when I get a few more colonies.

Is there any way I could use the 4¼x4¼ sections in this super? I can get all the empty shipping cases I want of the grocer of this size (been used, but good as new), and can buy them at a little price. The 4x5 section I should have to buy new.

I wish you would tell me whether to go ahead with the No. 4 super, or would you discontinue it. I will have to buy several supers this spring. I am going to increase to the limit, and some day I might have a good many colonies.

I could not get along without the American Bee Journal. ILLINOIS.

Answer.—The 4x5 section is a nuisance, but it was a matter of novelty when first issued. If your supers for these sections are similar to those I know of, you can use extracting frames of the 5¼ depth in them. You can also use 4¼ sections in them, but in that case you must cut those supers down ¾ inch and change your inside fixtures to fit the sections. As to advising you on this matter, it is difficult to do so.

Transferring, Requeening, Spray Poison, Moths

1. I have frames of honey from colonies that died this winter. Could I not transfer from a box hive into them any time before fruit blossom time?

2. When is the earliest date that it would be safe to requeen here?

3. How many days should the colony be without a queen before they are given a young queen?

4. Is there any way to prevent the fruit spray from killing the bees?

5. What can I use to keep moths from stored combs? IOWA.

Answers.—Yes, you can transfer onto those combs at any time. But you will surely want to save the brood from those box hives, and you will do it with more ease during fruit bloom.

2. Any time when you have the queens. If your bees must rear their own queens, better wait till near the end of the crop or after.

3. I prefer to introduce the young queen just as I remove the old one. If you can cage the old queen for an hour in the cage and then put the young queen in her place, you will have as good a chance as it is possible to have. Leaving a colony queenless till they know it and try to rear another is just that much against your success.

4. Try and get your neighbors to keep from spraying till the bloom has about fallen. It does not pay them to spray in bloom. We have never had any bees killed by spray; yet they spray fruit trees in our vicinity.

5. As answer to this, read the splendid article by Pangburn on page 90 of the March number. There is nothing better, and we could not give you so detailed an explanation in the Question Department.

Raising Queens

1. I grafted 15 Doolittle cell-cups with royal jelly, warm temperature, and gave to colony preparing to swarm, after destroying their natural cells. Ten cells accepted, drawn out and sealed. After sealing, bees built comb around nearly every cell, and at end of eleventh day one cell hatched a queen, one cell gave a queen that died shortly after emerging and the other eight had dead larvae. Larvae apparently had just passed the pupae state, but developed no farther. Color from brood disease. What happened?

2. For 8 to 10 cells, do you consider the broodless-queenless starting colony and finish over queen-excluder better than putting brood over excluder with queen below and giving grafted cups? CALIFORNIA.

Answers.—The statement that the bees built comb around every cell would indicate that they had some room to spare. Perhaps the cells were a little bit isolated and got chilled. Or perhaps you made the mistake to put drone larvae in those cells. That would account for it still better. If neither of these explanations is the right one, let the rest of the folks guess.

2. A broodless-queenless colony is rarely any good unless just made so purposely. I would prefer the other.

Size of Dovetailed Hive—Cotton as Honey Plant

1. I would like to know the standard size of the 10-frame dovetailed hive, measuring outside length, width and depth of brood-chamber.

2. Is ordinary field cotton of any value as a honey plant? If so, can the Italian bees extract nectar from the blossoms? MISSOURI.

Answers.—Length 10½, depth 9½, width (Root make) 16½, (Lewis make) 15½.

2. Cotton is diversely reported by different beekeepers. Pellett's "American Honey Plants" devotes three pages to this plant. It says, in part: "In some cotton-growing districts the beekeepers swear by cotton, while in other localities they declare that it is of little value. The character of the soil seems to be a very important factor in the secretion of nectar by this plant." One man writes: "Cotton blossoms furnish a great deal of excellent honey." —Jules Belknap, Arkansas.

Another man writes: "Bees will not work cotton if they can work anything else, even bitterweed." —W. D. Null, Alabama.

The Italian bees certainly work upon the bloom when there is honey in it. They also get honey from its extra-floral nectaries.

Miscellaneous

1. I have one hive this spring that never seems to work, while other hives do. I have a hive of foundation under it for them to fill out so they will have room to work. I must say, though that they are medium strong and are very heavy in stores.

2. What is a good way to introduce a queen to a colony of bees?

3. Can you suggest a means by which bees can tell their own hive better when in a row?

4. How would it be to have one colony filling out a bunch of frames? Am very short of drawn comb.

5. How would you requeen a hive?

6. What is a good way to increase artificially?

7. Is there any danger of giving a strong colony too much ventilation during swarming season, that is the hive set on four 1-inch blocks? Would it not chill the brood on cool nights? We have fairly cool nights here in May, June and July, with some hot days.

8. Do deep hives prevent swarming?

9. How many pounds of bees are there in the average colony?

10. How many combs (standard) will a pound of bees cover?

11. When you move a hive of bees a couple

of blocks distance what is the best precaution to take so that many of them will not fly back?

12. Is western Washington considered very good for bee culture. WASHINGTON.

Answer.—1. Open that colony some warm day and examine it. They may be queenless. They may not have enough bees to take care of the brood. Perhaps you gave them too much room and they have difficulty in keeping the hive warm in cool weather.

2. Cage her for 2 days, between two of the center combs and release her by putting a piece of honey cappings in place of the stopper.

3. Have some marks of recognition, a bush, some differently marked hives, roofs or hives of different colors, etc.

4. Certainly; by all means have plenty of combs.

5. As we said above, by introducing. Kill the old queen just before introducing the new one. If you have no queen, give them brood less than 3 days old.

6. Take the brood-combs of a colony, leaving the queen and bees at the old stand, and put the hive containing those combs on the stand of another hive, putting the latter in a new spot. Give them a queen if you have one. If not, they will rear one. Buy a text-book and read it.

7. No danger if you give the air only at the bottom. But if you stagger the stories, there may be a possibility of too much ventilation. Watch that.

8. Not always.

9. All the way from 2 pounds to 20, depending on the time of year and conditions of seasons.

10. Probably an average of a comb per pound of bees, if well covered, from end to end.

11. Disturb them thoroughly, so they may know something is wrong at the time you release them. Then place a slanting board in front of the entrance, so they may turn about and look back.

12. There are good spots there as elsewhere.

Transferring—Feeding

I have 4 colonies, 2 in 10-frame standard hives, 1 in a home-made hive, and 1 in a box hive. I want to transfer all of them into 10-frame hives with full sheet of foundation, because when I lived them I gave them just starters, and when transferring I do not want to cut away any of the old comb. First I intend to transfer the 2 I have in the 10-frame hives into my 2 new 10-frame dovetailed hives. In doing this I will put the old hive over the new, with an excluder between, and leave it so for three weeks. I then intend to take these two hives I transferred from and transfer my other 2 colonies into them the same way.

(a) I intend to start at the beginning of fruit bloom so I will have them transferred before the honey-flow. Will this be all right?

(b) When I transfer the last 2 colonies it will continue into the honey-flow, that is, I will still have the old hives over until the brood is all hatched. When the honey-flow starts, can I put a super underneath the old hive? And will they start to work in the super while the brood is hatching above?

(c) When you feed bees in the spring with a half-gallon tin pail in a super, what size nail do you use to make holes in the cover, and how many holes do you make?

(d) I want to feed the bees in my box hive; would it be necessary to turn it upside down and take bottom-off, or feed right on top with the tin pail feeder?

(e) Is pollen a light brown color, and do they put it right at the bottom of the cell? ILLINOIS.

Answers.—(a) It may work all right. Much depends upon the weather, the strength of the colonies and the crop.

(b) The proper place for supers is not underneath, but on top of the brood-chamber. Their tendency is to put the honey above the brood, not below it. They want it where the

robbers will have to go through their cluster to get to it.

(c) If you use a very small nail, you may make as many holes as you please. The honey or syrup will not flow too fast, because the atmospheric pressure keeps it in. Pin holes would be sufficient.

(d) You will need to use your ingenuity. If you have a large hole at the top of the box hive and use a small feeder, it may do to feed on top. Or you might use a Thale feeder and feed at the bottom. I would not like to turn a box hive bottom up, for it would change the location of the entrance and bewilder them enough that they might be robbed.

(e) Pollen is of half a dozen or more different colors, from white to dark brown, depending upon the flowers from which it was gathered. The bees sometimes fill the cells with it and sometimes put it only at the bottom, and even store honey on top of it.

Bees Between Walls

How can I save some bees that are between the plastered walls and the clapboards on the outside of an old house? The bees enter in an opening in the side of the house. It is a small hole, about $2\frac{1}{2}$ inches in diameter. Is there a way of making a trap to catch the bees as they fly out to the field in the daytime? I don't wish to tear the boards off the building.

CONNECTICUT.

Answer.—Removing the clapboards would be by far the best method of procedure. With a good bee smoker, first give the bees a puff at the entrance, keeping an eye to prevent them rushing out. Then remove the clapboards carefully. A good carpenter with a nail puller could remove them without much, if any, damage. When the combs are uncovered it would be easy to force the bees into some sort of a box and remove the combs, transferring them to movable frames in the usual way.

Trapping the bees as they fly out would do no good. Having no queen with them they would die.

The next best way is to force the swarm to leave, with the queen, by the use of smoke and drumming. Make a hole above the probable location of the brood-nest. We take it for granted that their present opening is below the swarm. There must be one hole below and one above. Then by driving a lot of smoke at the lower hole and pounding on the clapboards, you will drive them out, queen and all. Do this on a warm day, about the middle of the day. The objection to this method is that the abandoned brood will die in the wall and will cause more or less bad odor.

Moving—Dividing

I have 16 stands of bees which I set out of the cellar March 30, all wintered in first-class shape. I had 12 stands last year that made me \$275 at 20c per pound. Sold it all in my home town and could have sold a thousand pounds more if I had had it.

1. I want to move my bees a mile and a half this spring. Who will I write to to get a permit? Or will it be necessary for such a short distance?

2. I want to divide my bees for increase this spring so that they will build up for clover, as clover is our first heavy crop here. When is the best time to do this, or would you let them swarm?

Answers.—1. I do not believe it necessary to get a permit to move your bees that distance or out of the county. The only purpose of laws on moving bees is to prevent the spread of disease, and your intended removal will not cause it. Besides, your success indicates that you already have healthy colonies.

2. You will have to divide very early in order to get your colonies strong enough for

the clover crop. Remember that it takes 35 days from the time the egg is laid till the worker hatching from that egg becomes an active field worker. If you divide, you had best buy queens to use in your divisions as you will gain at least 10 days. We certainly prefer dividing to natural swarming. But the latter cannot always be controlled.

Settling a Swarm

Please tell me how to make a swarm settle down when flying in air. WISCONSIN.

Answer.—A first swarm always settles before flying away to a new home. Secondary swarms sometimes fail to do so. I have often tried to stop a runaway swarm, and I never succeeded, when they were in full flight. Noise never does any good. Perhaps a stream of water from a spraying hose would succeed. But who has such a thing ready? You may help them to select a spot to settle by holding up, on a pole, an old comb.

Ants

Please tell me in your Journal how I can keep ants from bothering bees, as I have trouble through the summer with them? TENNESSEE.

Answer.—The best way is to find their nest, pour a little gasoline into it and set fire to it. If they nest above the bees on top of the brood-chamber, you can scare them away with a little powdered sulphur, or dry ashes, or salt. Ashes, in a place where they won't get wet, will disgust the ants, especially if they are fine wood ashes. Sometimes a little coal oil rubbed about the places where they congregate compels them to move. If you use gasoline as mentioned, you must be very careful not to have the can within reach when you strike the match.

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West Virginia

The beekeepers of West Virginia are to have a Pan Handle summer meeting on August 10 and 11, at Elm Grove, West Virginia. Write to Mr. Will C. Griffith, of West Grove, for information. If anyone can make a meeting successful, he can. Wish we could be there.

New Jersey Field Meeting

The summer field meeting of the New Jersey Beekeepers' Association will be held in Samuel Buser's apiary, near North Haledon, Passaic County, on Saturday, July 10, 1920. The principal features of this meeting will be reasonable manipulations, including treatment of colonies for American foulbrood, by members, under the direction of the State bee expert.

Western New York Meeting

The annual summer meeting and basket picnic of the Western New York Honey Producers' Association will be held on July 31, at the apiary of Frank W. Churchill, West Valley, N. Y. A good program has been provided and all interested in bees or honey are cordially invited to attend.

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See Atwater's classified honey adv't.

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FOR SALE—Tennessee 3-banded Italians that are vigorous and prolific. No undersized queens mailed. Balance of season, each, \$1.25, dozen \$12.
William F. Morris, Hendersonville, Tenn.

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Robert B. Spicer, Wharton, N. J.

FOR SALE—A few choice Italian queens, \$2 each. Reference given.
Jes Dalton, Bordelonville, La.

I WISH TO THANK my beekeeping friends for their courteous and obliging way of doing business, and to inform them that I have no more queens for sale this season.
J. F. Diemer, Liberty, Mo.

FOR SALE—Large, hardy, prolific queens, 3-banded Italian only. Pure mating and safe arrival guaranteed. One queen, \$1.30; 6, \$7.50; 12, \$13.50; 100, \$110.
Buckeye Bee Co., Box 443, Massillon, Ohio.

FOR SALE—Queens, untested \$1.50, 6 \$7.50. Extractors, supplies.
R. Kramske, 1104 Victor St., St. Louis, Mo.

FOR SALE—Pure Italian queens. Select untested, 1, \$1.50; 6, \$7.50; 12, \$13.50; 50, \$55; 100 and over, each \$1. Also packages and nuclei.
Golden Star Apiaries, San Jose, Cal.

FOR SALE—Pure three-banded Italian queens, bred for honey production, reared by the Doolittle method. Untested, 1, \$1.25; 6, \$7; 12, \$13. Tested, 1, \$2.50; 6, \$14; 12, \$25.
H. W. Boley, Hillsboro, Iowa.

QUEENS, ITALIAN QUEENS—I will have about 100 untested queens a month surplus, for June, July and August. Who wants them at \$1 each? Less than 100, \$1.25 each.
W. H. Moses, Lane City, Texas.

FOR SALE—Untested golden Italian queens, \$1.25 each. Tested, \$2.50 each. Satisfaction guaranteed.
J. F. Michael, Winchester, Ind., R 1.

BOZZALLA LIGURIAN QUEENS—Obtain your queens from Italy. We take the risk of death in the mail. Select tested Italian queens posted direct from Enrico Bozzalla's apiaries to the customer, \$3.50 each. Remit to sole agent, H. M. Stich, Riccartbar Ave., Paisley, Scotland.

FOR SALE—Simmons' queens, goldens and three-bands, bred from prize winners. Also nucleus.
Allen Simmons, Claverack, N. Y.

FOR SALE—My famous three-banded Italian queens, \$1.25 each, six for \$7, from June 1 to November.
J. W. Romberger, Apiarist, 8113 Locust St., St. Joseph, Mo.

FOR SALE—3-banded Dr. Miller and Walker's queens after June 10. (Am booked full until then.) \$1.25 each, 6 for \$7, 12 for \$13; selects, 25c each higher.
Curd Walker, Jellico, Tenn., R 1, Box 18.

QUEENS—Italian queens of excellent stock will be ready to mail June 1. Untested, \$1.50 each; 6, \$7.50; 12, \$14.
J. D. Harrah, R. No. 1, Freewater, Ore.

FOR SALE—Hardy northern bred Italian queens, untested, \$2 each, 6 for \$11, May 15 to July 15. Select tested, \$3, after June 1.
Dr. C. E. Sheldon, Coeur D'Alene, Idaho.

FOR SALE—Italian queens that will give results; untested, \$2; tested, \$3; breeders, \$10.
A. Beyer, Krotz Springs, La.

QUEENS BY RETURN MAIL

I am now up with all orders and can take care of your wants, large or small. Why not stock up your yard with a good strain of Italian queens? I have them at the following prices, and guarantee safe delivery and make good all queens that are not as represented; free from disease: Single queen, \$1.50, six for \$7, 12 for \$13. Discount on large orders of 50 or more. Tested, \$2 each, six for \$11, 12 for \$20. Breeders, \$3.50 each.

A. B. MARCHANT, Jesup, Ga.

FOR SALE—8-banded Dr. Miller and Walker's queens after June 10. (Am booked full until then.) \$1.25 each, 6 for \$7, 12 for \$13; select, 25c each higher.
Curd Walker, Jellico, Tenn., R 1, Box 18.

FOR SALE—Italian queens. Prices for untested, in June, \$1.50 each, \$8.25 for six, \$16 for twelve; tested, \$2.50 each from July 1 to October 1; untested, \$1.25 each, \$7 for six, \$13.50 for twelve; tested, \$2 each; Virgins, 75c each. Mismatched queens will be replaced if returned in 30 days. Dead queens will be replaced if returned to me by return mail.
R. B. Grout, Jamaica, Vt.

FOR SALE—I. F. Miller's strain Italian queen bees. Northern bred for business from my best superior breeders; gentle, roll honey in, hardy, winter well, not inclined to swarm, 8-banded. Queens a specialty; 26 years breeding experience. Satisfaction guaranteed. Safe arrival in U. S. and Canada. Untested, \$1.40; 8, \$3.75; 6, \$7; 12, \$13. select untested, \$1.65; 8, \$4.60; 6, \$8.60; 12, \$16.
I. F. Miller, Brookville, Pa., R. 2.

FOR SALE—Hardy Italian queens, \$1 each
W. G. Lauver, Middletown, Pa.

FOR SALE—Superior California Queens—Western beekeepers may now secure our famous Italian queens at the following prices: One untested, \$1.25; fifty untested, \$57.50; one hundred untested, \$100. Orders filled in rotation; first deliveries March 1, 1920.
Edson Apiaries, Gridley, Calif.

FOR SALE—Leather colored Italian queens, tested, until June 1, \$2.50; after, \$2; untested, \$1.25; \$13 per dozen. Root's goods, Root's prices.
A. W. Yates,
15 Chapman St., Hartford, Conn.

FOR SALE—8-banded Italian queens from best honey-gathering strain obtainable; (no disease). Untested queens, \$1.25 each; 6, \$6.50; 12, \$12. Select untested, \$1.50 each; 6, \$9; 12, \$18. Tested, \$3.50 each. Safe arrival and satisfaction guaranteed. Your orders filled promptly.
W. T. Perdue & Sons,
R. No. 1, Fort Deposit, Ala.

BOOK YOUR ORDERS FOR QUEENS now—Goldens, \$3; tested, \$3; banded, \$1.50; tested, \$2.50; six or more 10 per cent less.
Clover Leaf Apiaries, Wahoo, Neb.

FOR SALE—Golden and three-band queens. Untested, April, May and June delivery, \$1.25 each; \$13.50 per doz. Satisfaction.
R. O. Cox, Rt. 4, Greenville, Ala.

MOTT'S Northern Bred Italian Queens—I have breeding mothers place in the south for April and early May queens. Plans "How to Introduce Queen and Increase," 25c. If you want beauty with the best of summer and winter laying birds, try a setting of my Golden Campines.
E. E. Mott, Glenwood, Mich.

FOR SALE—A. I. Root strain of resisting and honey-gathering, leather-colored Italian queens. Untested queens, \$1.50 each, 25 or more \$1.40. Tested, \$2.50 each, 25 or more, \$2.25. Select tested, \$3. For larger amounts write.
A. J. Pinard, Morgan Hill, Calif.

1920 PRICES on nuclei and queens, Miller strain. Queens, untested, \$1.50 each, \$15 per doz.; tested, \$2.00 each, \$22 per doz. One-frame nuclei, \$3; two-frame, \$5; three-frame \$6.50, without queens, f. o. b. Mason, Miss. Five per cent discount in lots of 25 or more. We have never had any bee or brood disease here. Will have no queens except with nuclei, until June 1. Safe arrival and satisfaction guaranteed.
Geo. A. Hummer & Sons, Prairie Point, Miss.

1920 PRICES for "She Suits Me" queens. Untested Italian queen, from May 15 to June 15, \$1.50 each. After June 15, \$1.80 each; \$12.50 for ten; \$1.10 each for 25 or more.
Allen Latham, Norwichtown, Conn.

FOR SALE—After April 15, our golden Italian queens, untested, one \$1.50 or \$15 per doz.; select untested, one, \$1.75 or \$18 per doz.; tested, \$3 each. Safe arrival guaranteed.
Tillery Bros.,
R. 5, Georgiana, Ala.

BEES AND QUEENS from my New Jersey apiary. J. H. M. Cook,
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"QUALITY" THREE-BANDED ITALIANS from excellent stock; untested queens, 1, \$1.50; 6 for \$7.50; 12 for \$13.50; 50 for \$65; 100 for \$100.
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BEES BY THE POUND, ALSO QUEENS—Booking orders now. Free circular gives prices, etc. See larger ad elsewhere.
Nueces County Apiaries, Calallen, Texas,
E. B. Ault, Prop.

HONEY AND BEESWAX

See Atwater's classified honey adv't.

WANTED—Beeswax. At present we pay 38 cents per pound in cash and 40 cents in trade for clean, yellow wax, delivered Denver.
The Colorado Honey Producers' Association,
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HONEY—Supply your customers, finest alfalfa-clover honey, extra strong cases, probably ready in July.
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WANTED—Extracted honey. State how packed. Send sample, lowest cash price.
P. Outzen, White Bear Lake, Minn.

FOR SALE—We have a limited amount of our crop white clover, extracted basswood honey, all packed in new 60-lb. cans, 3 to the case. Write for prices.
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FOR SALE—Clover and buckwheat honey in any style container (glass or tin). Let us quote you.
The Deroy Taylor Co.,
Newark, N. Y.

WANTED—White clover or light extracted honey. Send sample; state how honey is put up and lowest cash price delivered at Monroe; also buy beeswax.
E. B. Rosa, Monroe, Wis.

WANTED—Shipments of old comb and cappings for rendering. We pay the highest cash and trade prices, charging but 5c a pound for wax rendering. Fred W. Muth Co.,
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WANTED—Comb and extracted honey.
The L. H. Snider Apiaries, Auburn, Ind.

FOR SALE

See Atwater's classified honey adv't.

FOR SALE—120 shallow extracting supers, 5 1/2 inch, with full drawn combs (painted), 95c each; 6 10-frame hives complete with wired full sheets foundation combs at \$3 each; 40 10-frame hives complete with empty frames and painted, at \$2 each; 25 lb. (Dadant) medium brood foundation comb at 65c.
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FOR SALE—Cedar or pine dovetailed hives; also full line of supplies, including Dadant's foundation. Write for catalog.
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FOR SALE—"Superior" Foundation (Weed process). Quality and service unexcelled.
Superior Honey Co., Ogden, Utah.

WANTED

See Atwater's classified honey adv't.

WANTED—To buy small extractor; must be in working condition. Address Box 8, Springville, Ala.

WANTED—Your old combs, cappings and slumgum to render into beeswax. We get enough more wax with our well equipped presses to pay for our work.
Dadant & Sons, Hamilton, Ill.

WANTED—Your order for "Superior" Foundation. Prompt shipments at right prices.
Superior Honey Co., Ogden, Utah.

WANTED—Honey, in 5 or 10-lb. cans.
Lang, 1609 Dayton St., Chicago.

WANTED—Undamaged copies of February, 1920 American Bee Journal. Will pay 10c a piece. When mailing wrap so the entire copy is covered.
American Bee Journal,
Hamilton, Ill.

WANTED—Extracted honey in white and amber grades. State lowest price; how packed. Send sample.
Harmony Bee & Honey Co.,
White Bear Lake, Minn.

SITUATIONS

See Atwater's classified honey adv't.

WANTED—One experienced man, and students or helpers, in our large bee business; good chance to learn. Modern equipment and outfit, including auto truck; located near summer resorts. Write, giving age, height, weight, experience, reference and wages wanted.
W. A. Lathaw Co., Clarion, Mich.

WANTED—One or two good queen-rearing men to begin work February 15, 1920.
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SUPPLIES

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FOR SALE—Soiled cane sugar in barrels at 15c pound. Orders filled in rotation.
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FOR SALE—Second-hand 8 and 10-frame comb-honey supers, for 4x6 sections; 1 2-frame Root honey extractor. Also some extra section holders and fences. If interested, write; will sell at a bargain.
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FOR SALE—Used tins, 5-gal., bright inside, washed outside, new corks separate, cases complete, two to case, 75c per case; ten cases or more, 60c per case. One or a car load. Cash or trade for honey. Bruner, the Beeman,
3836 N. Kostner Ave., Chicago.

FOR SALE—10-frame dovetailed hives in lots of one to fifty, very cheap.
Wm. Craig, Aitkin, Minn.

SPECIAL PRICE overstock sale on 1-story, 8-frame S. W. hives. Shipping cases to hold 24 sections 4 1/4 x 4 1/4 x 1 1/2 Hoffman frames 1 1/2 inch spacing. Modified frames, Jumbo depth, 1 1/4 inch spacing. Ask for quotations.
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C. H. W. Weber & Co.,
2146 Central Ave., Cincinnati, O.

FOR SALE—Good second-hand empty 60-lb honey cans, two cans to the case, at 60c per case f. o. b. Cincinnati. Terms, cash with order.
C. H. WEBER & CO.,
2146 Central Ave., Cincinnati, O.

SEND us a list of goods wanted and will quote you lowest prices. We are the money-saving house. Price list free. Try us.
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MISCELLANEOUS

See Atwater's classified honey adv't.

WRITE for shipping tags and our prices for rendering your old combs, cappings, etc. We guarantee a first-class job.
The Deroy Taylor Co., Newark, N. Y.

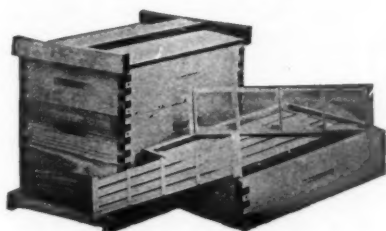
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We guarantee the safe arrival and absolute satisfaction of all "Falcon" queens and bee supplies bought from us. Nor does our service end after the goods reach you. Keep in touch with us at all times and in all seasons; we are equally interested in your results with "Falcon" articles, as in all your bee-keeping needs.

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QUEENS

Quirin's Improved Superior Italian Bees and Queens. They are Northern Bred and Hardy. 25 years a Queen Breeder.

PRICES	Before July 1			After July 1		
	1	6	12	1	6	12
Select untested	\$1.50	\$ 8.00	\$15.00	\$1.00	\$ 5.50	\$10
Tested	2.00	10.00	18.00	1.50	8.00	14
Select tested	2.50	14.00	25.00	2.00	10.00	18

BREEDERS—The cream from our entire stock of outyards, \$5 each, usually we can send all queens promptly after June 10th.

Breeders, select tested and tested queens can be sent out as early as weather will permit.

Send for testimonials. Orders booked now.

No bees sold except with breeders, when a two-comb nuclei will be furnished for \$5.

H. G. QUIRIN, Bellevue, O.

QUINN'S QUEENS OF QUALITY

Have no superiors—"There's a reason." Are Mendelian bred, good qualities accentuated. Gray Carniolans, Gray Caucasians, most gentle of all, prolific, hardy, vigorous, disease-resistant, white comb builders—they deliver the goods.

ITALIANS, 3-banded, line bred, pedigreed; need no boosting; they speak for themselves.

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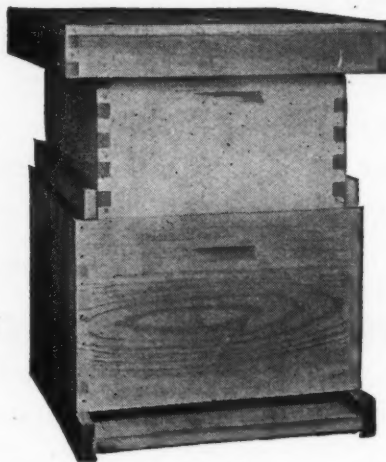
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Glance at this illustration to compare this hive with "Standard" Langstroth hive.

Your present brood equipment can be put above the Modified Dadant hive used as full-depth supers.



You get 40 per cent greater brood-comb area than in the "Standard" ten-frame Langstroth.

You get deep frames, large one-story brood-nest, frame space ventilation, excellence in wintering, swarming easily controlled.

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1. Eleven frames, Langstroth length, Quinby depth.
2. Frames spaced $1\frac{1}{2}$ inches for swarm control.
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4. Dovetailed body, regular reversible bottom and metal roof cover with inner cover.
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For free booklet write any distributor of Lewis "Beeware," or to

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The largest and oldest Bee Supply manufacturer in Minnesota can offer you BEE WARE that will keep that "satisfied smile" on your face. Excellent quotations given on frames, spacing or unspacing. Write to MONDENG about hives and supers. Made of polished white pine.

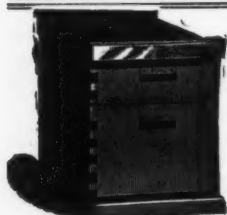
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 Send for my 1920 Catalog and Price List.
 LOOK for the best bargains I've presented.

Will take your Beeswax in Trade at Highest Market Price

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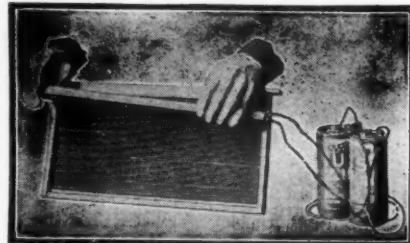


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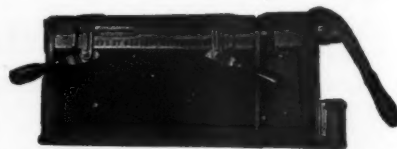
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Actually cements wires in the foundation. Will work with dry cells or with city current in connection with transformer. Best device of its kind on the market.

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PAT. JULY 30, 1918

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Complete directions for operating are furnished with each device.

Manufactured by C. O. BRUNO
 1413 South West Street, Rockford, Illinois

PRICES OF QUEENS

	Nov. 1 to June 1			June 1 to Nov. 1		
	1	6	12	1	6	12
Untested -----	\$2.00	\$9.00	\$16.80	\$1.50	\$8.00	\$14.50
Select untested -----	2.25	10.50	18.00	2.00	9.50	16.00
Tested -----	3.00	16.50	30.00	2.50	12.00	22.00
Select tested -----	3.50	19.50	36.00	3.00	16.50	30.00

Breeders \$7.50 to \$15.00

Queens for export will be carefully packed in long-distance cages, but safe delivery is not guaranteed.

"The queen that I got from you last season made honey when the other bees were taking lunch to the fields with them (when they went at all)".
H. M. TICHENOR, Centertown, Ky.

2058 Yonge St., Toronto Canada March 19, 1920.

Friend Davis:

The colonies headed by your queens are through this far in fine shape. It was a pleasing sight to see them take their first flight (after 4 months) this last week. What is the price of queens to us folks on this side this year, and when could you start to send me up some? A reply would oblige
Yours Respectfully,

P. F. OLIVER.

No Nuclei, Full Colonies or Pound Packages.

BEN G. DAVIS, Spring Hill, Tenn.

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We manufacture millions of sections every year that are as good as the best. The **cheapest** for the **quality**; **best** for the price. If you buy them once, you will buy again.

We also manufacture **hives, brood-frames, section holders and shipping cases.**

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The honey flow is now on. Honey means Dollars to you; don't lose a pound of it by being short of Supplies. We carry a full line of Bee Supplies ready for prompt shipment to you—Hives, Frames, Supers, SECTIONS, Foundation, Extractors, Smokers, Comb Honey Shipping Cases, Tin Honey Cans and Pails. Our goods are ideal in quality and workmanship. Learn more about our goods by sending for our catalog.

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ITALIAN QUEENS



The Old Reliable Three-Banded Italians. The best allround bee to be had. Queens ready to mail April 1. Will book orders now. Will guarantee safe arrival in United States and Canada. Prices for April and May:

Untested, \$1.50; 6, \$8; 12, \$15
Tested, \$2.25; 6, \$12; 12, \$22.

Select tested, \$3 each.

Descriptive circular and price list free.

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We furnish full colonies of Italian bees in double-walled hives, single-walled hives, shipping boxes and 3-frame nucleus colonies.

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Write for Price List and
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Vincennes, Ind.



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at Newark, Wayne Co., N. Y., ready to answer your call. The best of everything. Just read this list: Lewis Beeware, Sections, Shipping Cases, Frames, Hives, Hershiser Wax Presses and other supplies, Dadant's Unexcelled Foundation, all standard weights and sizes; also the Electric Wire Imbedder, Bingham Uncapping Knives, including steam heated, with oil stoves and generators. Bingham Smokers, all sizes, with genuine leather bellows; Root's Extractors, all sizes of hand and power machines; Bee Books, written by all leading authors in beedom.

All sizes of Friction Top Pails, and also 60-lb. Cans, new and second hand. Also Cement-coated Nails for nailing beehives and supplies; and all sized spools of Tinned Wire, Bee Brushes, Feeders, Queen-Rearing Cages, Bee Gloves and Capping Melter, and all practical supplies you will need.

A market for your honey or wax and a plant to render your old combs and cappings.

Over 1,000 beekeepers took advantage of this service station at Newark in 1919 for the first time. Now all together for a greater 1920.

New catalog free. Our discounts will save you money.

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Send list of your needs or request for new Catalogue to Department B.

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	June	July to Oct. 1
Untested.....	\$2.50	\$2.00
Select Untested.....	3.00	2.50

QUANTITY DISCOUNTS

12 Queens	10% Disconnt
25 "	15% "
50 "	20% "
100 "	25% "

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QUEENS, SELECT THREE-BANDED ITALIANS

Reared from the best mothers and mated to select drones.

Prices of Queens

	May 1st to June 1st			June 1st to July 1st			July 1st to Nov. 1st		
	6	12		1	6	12	1	6	12
Untested.....	\$2.00	\$ 9.00	\$16.80	\$1.50	\$ 8.50	\$14.50	\$1.30	\$ 7.50	\$13.50
Select Untested.....	2.25	10.50	18.00	2.00	9.50	16.00	1.75	8.50	15.00
Tested.....	3.00	16.50	30.00	2.50	12.00	22.00	2.00	10.00	18.50
Select Tested.....	3.50	19.50	36.00	3.00	16.50	30.00	2.75	15.00	27.00

Orders booked now for May delivery. Pure mating, safe arrival and entire satisfaction guaranteed. Wings clipped free. Write for descriptive circular.

HARDIN S. FOSTER, Columbia, Tenn.

Crop and Market Report

Compiled by M. G. Dadant

For our July crop and market report we asked the following questions: 1. How is the crop—size, comparison with last year? 2. What number of colonies is there compared to last year? 3. Any demand for honey? What price is offered? What price will you hold for? 4. Have you your container supply?

THE CROP SO FAR

It is yet a little early to make any estimate on what the crop is going to be this year, but there are some indications which would point toward about a normal honey crop.

In the East reports are very poor, especially from New York, where they have had a great deal of drought and do not expect very much of a spring crop. Ohio and Pennsylvania expect about the same as last year, while throughout the whole South reports are that beekeepers will do well if they get as much honey as last year. In Georgia about one-half to three-fourths as much honey has been harvested as at the same time last year. In Mississippi and Alabama probably the crop is a little better, while in most of the other Southern States the crop is probably below the average. In Florida it is much less.

In Texas conditions are extremely favorable. Practically every section of the country there reports an excellent crop, with good prospects for the balance of the year. As a result, beekeepers are very much encouraged, since honey is still selling at a very high figure.

In the Northern States of Michigan, Wisconsin and Minnesota it is a little early yet to make any definite report, but it would seem that Michigan will have many less bees than last year, and the prospect will hardly be as good for a honey flow. Wisconsin reports the finest prospect in years, and Minnesota, also, expects a very good crop.

In Indiana and Illinois reports vary greatly. In some sections clover is yielding well, in others there is not enough clover to make nearly a crop. In our own locality there is a little clover, but so far bees have harvested very little, if anything, and supers are just beginning to be placed on the colonies. Many reports state that clover is abundant, but that the bees are working on it but very little, owing to the drought. Of course, a good rain with warm weather would make the clover yield more plentifully. Missouri reports only a fair yield.

Prospects throughout the most of Iowa seem to be good, and Kansas and South Dakota report fair prospects, also.

Very little honey has been harvested, so far, through the Rocky Mountain region, although indications seem to be that there will be a good flow. The alfalfa has been hurt quite badly in some sections, but this is probably made up by the excellent growth of sweet clover, and it would seem that Colorado would have a little better crop than last year, with Montana about equal to 1919.

Wyoming and Utah expect much better crops than last year, while Idaho has had no flow yet, but expects a fair crop later on.

The western coast has had abundant rain, which would indicate a very good honey flow.

The flow from orange blossom in California has been just about up to last year. The outlook for a flow from sage is good and we have no doubt but that the California crop will at least equal that of 1919.

NUMBER OF COLONIES COMPARED WITH LAST YEAR

The May first report of the Department of Agriculture at Washington indicates that on this date colonies averaged 98 per cent of normal, whereas in 1919 they averaged only 92 per cent. This would indicate that colonies are in better shape than a year ago. However, our own private reports indicate that in some localities the winter loss was extremely severe, and it will be all that the beekeepers can do to make increase and cover all the combs. Our own judgment would be that there will not be nearly as many colonies to gather the crop as a year ago, and we would think it would be about 80 per cent. Of course, this is probably made up by the fact that many beekeepers are buying bees in packages from the South and making increase in this manner, so that it does not hurt their strong colonies at all to cover all combs.

HONEY DEMAND—PRICE ASKED

So far, very few buyers are out trying to purchase honey, but such as are in the market seem to be offering a good price. Practically all reporters indicate that they will hold for a price of 25c a pound wholesale for their honey, with a good chance of getting it. The Texas crop is moving at a price of about 22c for extracted and 24c to 26c for bulk comb honey.

One reporter in Georgia was offered 20c a pound for his white honey and is holding for a price of 25c. Another from Florida was offered 21c and is asking 23c for amber.

A large commission merchant in California has a car of white sweet clover honey which he is offering at 19c per pound f. o. b. California common points. Orange blossom honey is also being offered at a price of from 20½c to 21½c f. o. b. California points. Practically all of the old stock is cleaned off the market, and owing to the high price and scarcity of sugar, honey is in extremely good demand.

HONEY CONTAINERS

Practically all of the tin can manufacturers state that they will be unable to supply cans outside of contracts already let until probably the first of August. Developments in the last week or ten days, however, would indicate that the freight congestion is gradually clearing up and it may be possible that these manufacturers may be in a position to get tin plate earlier than this.

CONCLUSION

Our conclusion in regard to honey would be that it is very likely to open at a much higher price than last year, when honey was quoted at from 15c to 18c per pound for car lots f. o. b. California common points. Sugar seems still to be very scarce, and newspaper reports point to the fact that it will be two or three years before France and other European countries will be able to reach normal production on sugar.

THREE BAND ITALIANS TESTED DISEASE RESISTORS

PRICES				
	June 15 to July 15			
Untested.....	1.50	6	12	
Select untested.....	1.75	9.00	16.00	
July 15 to Oct. 1				
Untested.....	1.30	7.50	13.50	110.00
Select untested.....	1.60	8.00	14.00	115.00
Select tested, any time after June 20.....	3.00	16.00	29.00	
Select day-old virgins, after June 1.....	.60	3.50	6.50	50.00

D. A. DAVIS, Birmingham, Mich.
216 Greenwood

BARNES' Foot Power Machinery

Read what J. E. Rarent, of Charlton, N. Y., says: We cut with one of your Combined Machines last winter 50 chaff hives with 7-in. cap, 100 honey-racks, 500 frames and a great deal of other work. This winter we have a double amount of hives, etc., to make with this saw. It will do all you say of it." Catalog and price list free.



W. F. & JOHN BARNES
395 Ruby St., ROCKFORD, ILLINOIS

Established 1885

We are still furnishing beehives made of white pine; they will last. A. I. Root Co.'s make of bee supplies kept in stock. Send for catalog giving full particulars; free for the asking. Beeswax in exchange for supplies, or cash.

JOHN NEBEL & SON SUPPLY CO.
High Hill, Montg. Co., Mo.

ATTENTION, PACIFIC NORTH-WEST BEEKEEPERS!

We handle a full line of supplies for beekeepers, including Italian Queens. Write us your requirements and for our Catalog A. It's free.

SPOKANE SEED CO.,
906 First Ave. Spokane, Wash.

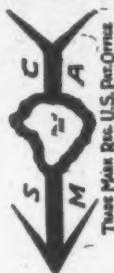
WESTERN BEEKEEPERS

were glad to know that the pressure their increasing patronage demanded resulted in the establishment of a branch of the Root Company at Council Bluffs, Iowa, the local point of western shipping activities.

¶ The first season's business here has more than justified the contention of the Root Company, that western honey producers must have a factory and a center of their own. The Council Bluffs branch wishes to publicly thank the many beekeepers for their expressions of interest in us, and their hearty welcome. And to state, also, that it is the determination of this company to keep everlastingly at this business of maintaining the high quality of the Root goods, and of improving---always improving---the promptness and thoroughness of our service.

¶ We are now stocked with all the goods you need to market a maximum crop; of shipping cases, cans and jars. We will be glad to give your order particular attention. We can save you money, time and freight charges. Use us.

THE A. I. ROOT CO. OF IOWA
COUNCIL BLUFFS, IOWA



ALWAYS MAKE SURE THAT THIS TRADE-
MARK IS STAMPED ON EACH PIECE OF

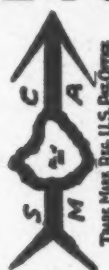
"Tidewater" Cypress
"THE WOOD ETERNAL"

THEN YOU BUY SAFETY (AND SATISFAC-
TION) FIRST, LAST AND 'TWEEN TIMES



"ALL-HEART" GRADE FOR BEEKEEPERS' USE

**Southern
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Association**



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**1251 Hibernia Bank Building
NEW ORLEANS, LA.**

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JACKSONVILLE, FLA.**

FOREHAND'S THREE BANDS THE THRIFTY KIND

Twenty-eight years of select breeding brings these bees up to a standard surpassed by none, but superior to many.

Place your order now for June delivery of queens. We have booked as many orders for pound bees as we can handle this season.

PRICES AFTER JUNE 1

	1	6	12	100 Each
Untested	\$1.50	\$ 7.50	\$13.50	\$1.00
Select Untested	1.75	9.00	16.50	1.25
Tested	2.50	13.00	24.50	2.00
Select Tested	4.00	22.00	41.50	3.35

No reduction in prices after July 1 as stated in circular.

W. J. FOREHAND & SONS, The Bee Men
Fort Deposit, Alabama

A Great Sales Record of A Great Bee Book

Here is a record for the sale of a standard class book, not often equalled in any field, and never approached before by any bee book.

On July 1, 1919, one year ago, this company completed the printing and binding of 10,000 of the 1919 edition of the



On May 1, 1920, these 10,000 copies of the world's greatest bee book had been exhausted. A new issue of the 1919 edition is now completed, and we are again filling orders for the same. It is the indispensable book to every up-to-date beekeeper everywhere.

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MEDINA, OHIO